

# SECTION 1

## INTRODUCTION AND GENERAL DISCUSSION

### 1.1 Introduction

This document is a safety evaluation report (SER) on the application for license renewal (LR) for the Browns Ferry Nuclear Plant (BFN), as filed by Tennessee Valley Authority (TVA or the applicant). By letter dated December 31, 2003, TVA submitted its application to the U.S. Nuclear Regulatory Commission (NRC or the Commission) for renewal of the BFN operating licenses for an additional 20 years. The NRC staff (the staff) prepared this report, which summarizes the results of its safety review of the renewal application for compliance with the requirements of Title 10, Part 54, of the *Code of Federal Regulations*, (10 CFR Part 54), "Requirements for Renewal of Operating Licenses for Nuclear Power Plants." The NRC license renewal project managers for the BFN license renewal review are Ram Subbaratnam and Yoira Diaz-Sanabria. Mr. Subbaratnam can be contacted by telephone at 301-415-1478 or by electronic mail at [rxs2@nrc.gov](mailto:rxs2@nrc.gov); Ms. Diaz-Sanabria can be contacted by telephone at 301-415-1594 or by electronic mail at [yks@nrc.gov](mailto:yks@nrc.gov). Alternatively, written correspondence may be sent to the following address:

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In its December 31, 2003, submittal letter, the applicant requested renewal of the operating licenses issued under Section 104b (Operating License Nos. DPR-33, DPR-52, and DPR-68) of the Atomic Energy Act of 1954, as amended, for BFN Units 1, 2, and 3 for a period of 20 years beyond the current license expiration dates of midnight December 20, 2013, for Unit 1; midnight June 28, 2014, for Unit 2; and midnight July 2, 2016 for Unit 3. The BFN units are located on the north shore of Wheeler Reservoir in Limestone County, Alabama, at Tennessee River Mile 294. The site is approximately 30 miles west of Huntsville, Alabama; it is also 10 miles northwest of Decatur, Alabama and 10 miles southwest of Athens, Alabama. The NRC issued the construction permits for Unit 1 on May 10, 1967; for Unit 2 on May 10, 1967; and for Unit 3 on July 31, 1968. The staff issued the operating licenses for Unit 1 on December 20, 1973; for Unit 2 on June 28, 1974; and for Unit 3 on July 2, 1976. All of the units consist of a Mark I boiling water reactor (BWR) with a nuclear steam supply system supplied by General Electric Corporation. The balance of each of the plants was originally designed and constructed by TVA. Unit 1 licensed power output is 3293 megawatt thermal (MWt), with a gross electrical output of approximately 1100 megawatt electric (MWe). Units 2 and 3 licensed power output is 3458 MWt, with a gross electrical output of approximately 1155 MWe. The updated final safety analysis report (UFSAR) contains details concerning the plant and the site. The units operated from the original licensing until 1985 when they were voluntarily shut down by the applicant to address management and technical issues. The applicant then implemented a comprehensive nuclear performance plan to correct the deficiencies that led to the shutdown. This plan included changes in management, programs, processes and procedures, as well as extensive equipment refurbishment, replacement, and modifications. Unit 2 was subsequently restarted in

1991, and Unit 3 followed in 1995. In the early 1990s, the applicant decided to defer restart of Unit 1. Unit 1 is currently in a shutdown status.

The license renewal process consists of two concurrent reviews - a technical review of safety issues and an environmental review. The NRC regulations found in 10 CFR Parts 54 and 51, respectively, set forth the requirements against which license renewal applications are reviewed. The safety review for the BFN license renewal is based on the applicant's license renewal application (LRA) and on the responses to the staff's requests for additional information (RAIs). The applicant supplemented and clarified its responses to the LRA and RAIs in audits, meetings, and docketed correspondence. Unless otherwise noted, the staff reviewed and considered information submitted through December 31, 2005. The public may view the LRA and all pertinent information and materials, including the UFSAR mentioned above, at the NRC Public Document Room, located in One White Flint North, 11555 Rockville Pike (first floor), Rockville, MD 20852-2738 (301-415-4737/800-397-4209), and at the Athens-Limestone Public Library, 405 South Street East, Athens, AL, 35611. In addition, the public may find the BFN Units 1, 2, and 3 LRA, as well as materials related to the license renewal review, on the NRC website at [www.nrc.gov](http://www.nrc.gov).

This SER summarizes the results of the staff's safety review of the BFN LRA and describes the technical details considered in evaluating the safety aspects of the units' proposed operation for an additional 20 years beyond the term of the current operating licenses. The staff reviewed the LRA in accordance with NRC regulations and the guidance provided in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR), dated July 2001.

SER Sections 2 through 4 address the staff's review and evaluation of license renewal issues that it has considered during the review of the application. Section 5 is reserved for the report of the Advisory Committee on Reactor Safeguards (ACRS). The conclusions of this report are in Section 6.

SER Appendix A is a table that identifies the applicant's commitments associated with the renewal of the operating licenses. Appendix B provides a chronology of the principal correspondence between the NRC and the applicant related to the review of the application. Appendix C is a list of principal contributors to the SER. Appendix D is a bibliography of the references used in support of the review.

In accordance with 10 CFR Part 51, the staff prepared a plant-specific supplement to the Generic Environmental Impact Statement (GEIS). This supplement discusses the environmental considerations related to renewing the licenses for BFN Units 1, 2, and 3. The staff issued (draft) Supplement 21 to NUREG-1437, "Generic Environmental Impact Statement for License Renewal of Nuclear Plants: Regarding Browns Ferry Nuclear Plant, Units 1, 2, and 3: Draft Report for Comment," on December 3, 2004. The final report was issued on June 23, 2005.

## **1.2 License Renewal Background**

Pursuant to the Atomic Energy Act of 1954, as amended, and NRC regulations, operating licenses for commercial power reactors are issued for 40 years. These licenses can be renewed for up to 20 additional years. The original 40-year license term was selected on the basis of economic and antitrust considerations, rather than on technical limitations; however, some individual plant and equipment designs may have been engineered on the basis of an expected 40-year service life.

In 1982, the staff anticipated interest in license renewal and held a workshop on nuclear power plant aging. This workshop led the NRC to establish a comprehensive program plan for nuclear plant aging research. On the basis of the results of that research, a technical review group concluded that many aging phenomena are readily manageable and do not pose technical issues that would preclude life extension for nuclear power plants. In 1986, the staff published a request for comment on a policy statement that would address major policy, technical, and procedural issues related to license renewal for nuclear power plants.

In 1991, the staff published the license renewal rule in 10 CFR Part 54 (the Rule). The staff participated in an industry-sponsored demonstration program to apply the Rule to a pilot plant and to gain experience necessary to develop implementation guidance. To establish a scope of review for license renewal, the Rule defined age-related degradation unique to license renewal; however, during the demonstration program, the staff found that adverse effects of aging occur to plant systems and components and the effects are managed during the period of initial license. In addition, the staff found that the scope of the review did not allow sufficient credit for existing programs, particularly the implementation of the Maintenance Rule, which also manages plant-aging phenomena. As a result, the staff amended the license renewal rule in 1995. The amended 10 CFR Part 54 established a regulatory process that is simpler, more stable, and more predictable than the previous license renewal rule. In particular, the staff amended 10 CFR Part 54 to focus on managing the adverse effects of aging rather than on identifying age-related degradation unique to license renewal. The staff initiated these rule changes to ensure that important systems, structures, and components (SSCs) will continue to perform their intended functions during the period of extended operation. In addition, the revised Rule clarified and simplified the integrated plant assessment (IPA) process to be consistent with the revised focus on passive, long-lived structures and components (SCs).

In parallel with these efforts, the staff pursued a separate rulemaking effort and developed an amendment to 10 CFR Part 51 to focus the scope of the review of environmental impacts of license renewal and fulfill the NRC's responsibilities under the National Environmental Policy Act of 1969 (NEPA).

### **1.2.1 Safety Review**

License renewal requirements for power reactors are based on two key principles:

1. The regulatory process is adequate to ensure that the licensing bases of all currently operating plants provide and maintain an acceptable level of safety, with the possible exception of the detrimental effects of aging on the functionality of certain SSCs, as well as a few other safety-related (SR) issues, during the period of extended operation;

2. The plant-specific licensing basis must be maintained during the renewal term in the same manner and to the same extent as during the original licensing term.

In implementing these two principles, 10 CFR 54.4 defines the scope of license renewal as including those SSCs (1) that are SR; (2) whose failure could affect SR functions; and (3) that are relied on to demonstrate compliance with the NRC's regulations for fire protection (FP), environmental qualification (EQ), pressurized thermal shock (PTS), anticipated transient without scram (ATWS), and station blackout (SBO).

Pursuant to 10 CFR 54.21(a), an applicant for a renewed license must review all SSCs that are within the scope of the Rule to identify SCs that are subject to an aging management review (AMR). Those SCs that are subject to an AMR perform an intended function without moving parts or without a change in configuration or properties, and are not subject to replacement based on qualified life or specified time period. As required by 10 CFR 54.21(a), an applicant for a renewed license must demonstrate that the effects of aging will be managed in such a way that the intended function, or functions, of those SCs will be maintained, consistent with the current licensing basis (CLB), for the period of extended operation; however, active equipment is considered to be adequately monitored and maintained by existing programs. In other words, the detrimental effects of aging that may affect active equipment are more readily detectable and can be identified and corrected through routine surveillance, performance monitoring, and maintenance activities. The surveillance and maintenance activities programs for active equipment, as well as other aspects of maintaining the plant design and licensing basis, are required throughout the period of extended operation.

Pursuant to 10 CFR 54.21(d), each LRA is required to include a supplement to the FSAR (final safety analysis report) or UFSAR. This supplement must contain a summary description of the applicant's programs and activities for managing the effects of aging and the evaluation of time-limited aging analyses (TLAAs) for the period of extended operation.

License renewal also requires the identification and updating of the TLAAs. During the design phase for a plant, certain assumptions are made about the length of time the plant can operate. These assumptions are incorporated into design calculations for several of the plant's SSCs. In accordance with 10 CFR 54.21(c)(1), the applicant must either show that these calculations will remain valid for the period of extended operation, project the analyses to the end of the period of extended operation, or demonstrate that the effects of aging on these SSCs can be adequately managed for the period of extended operation.

In 2001, the NRC developed and issued Regulatory Guide (RG) 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses". This RG endorses Nuclear Energy Institute (NEI) 95-10, "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," which was issued in March 2001, by NEI. NEI 95-10 details an acceptable method of implementing the license renewal rule. The staff also used the SRP-LR to review this application.

In the LRA, BFN fully utilizes the process defined in NUREG-1801, "Generic Aging Lessons Learned (GALL) Report," issued in July 2001. The GALL Report provides the staff with a summary of staff-approved aging management programs (AMPs) for the aging of many SCs that are subject to an AMR. If an applicant commits to implementing these staff-approved AMPs, the time, effort, and resources used to review an applicant's LRA can be greatly

reduced, thereby improving the efficiency and effectiveness of the license renewal review process. The GALL Report summarizes the aging management evaluations, programs, and activities credited for managing aging for most of the SCs used throughout the industry. The report also serves as a reference for both applicants and staff reviewers to quickly identify those AMPs and activities that the staff determined can provide adequate aging management during the period of extended operation.

### **1.2.2 Environmental Review**

Title 10, Part 51, of the *Code of Federal Regulations* (10 CFR Part 51) governs environmental protection regulations. In December 1996, the staff revised the environmental protection regulations to facilitate the environmental review for license renewal. The staff prepared a "Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Plants" (NUREG-1437, Revision 1) to document its evaluation of the possible environmental impacts associated with renewing licenses of nuclear power plants. For certain types of environmental impacts, the GEIS establishes generic findings that are applicable to all nuclear power plants. These generic findings are codified in Appendix B to Subpart A of 10 CFR Part 51. Pursuant to 10 CFR 51.53(c)(3)(i), an applicant for license renewal may incorporate these generic findings in its environmental report. In accordance with 10 CFR 51.53(c)(3)(ii), an environmental report must also include analyses of those environmental impacts that must be evaluated on a plant-specific basis (i.e., Category 2 issues).

In accordance with NEPA and the requirements of 10 CFR Part 51, the staff performed a plant-specific review of the environmental impacts of license renewal, including whether new and significant information existed that the GEIS did not consider. As part of its scoping process, the staff held a public meeting on April 1, 2004, in Athens, Alabama to identify environmental issues specific to the plant. The NRC's draft plant-specific Supplement 21 to the BFN GEIS, which was issued on December 1, 2004, documents the results of the environmental review and includes a preliminary recommendation with respect to the license renewal action. The staff held another public meeting on January 25, 2005, in Athens, Alabama, to discuss the draft plant-specific Supplement 21 to the GEIS. After considering comments on the draft, the staff published a final, plant-specific supplement to the GEIS separately from this report on June 23, 2005.

## **1.3 Principal Review Matters**

### **1.3.1 Operating Experience for BFN Unit 1 in Satisfying the Intent of the License Renewal Rule**

#### **1.3.1.1 *Regulatory Framework***

Section 54.17(c) of 10 CFR states that an application for a renewed license may not be submitted earlier than 20 years before the expiration of the operating license currently in effect. The operating license for BFN Unit 1 expires on December 20, 2013; for Unit 2, on June 28, 2014; and for Unit 3, on July 2, 2016. The license renewal application for Units 1, 2, and 3 was submitted on December 31, 2003. Thus, all units met this regulatory requirement and no plant-specific exemptions were required.

When 10 CFR Part 54 was published, the Commission originally determined that a 20-year period of plant-specific operating experience would allow adequate assessment of any age-related degradation of plant structures, systems, and components. The statement of consideration (SOC) hence implied an intent of a 20-year threshold limit to ensure that substantial operating experience is accumulated by licensees before the submittal of license renewal applications. From that consideration, BFN Unit 1's 10-year operating history does not entirely meet that intent. The Advisory Committee on Reactor Safeguards (ACRS or the Committee), in an interim report dated October 19, 2005, on the safety aspects of the license renewal application for BFN Units 1, 2, and 3, commented that 10 years of plant-specific operating experience for BFN Unit 1, by itself, does not fully meet the intent of the license renewal rule. TVA, in its response dated November 16, 2005, submitted for the Committee's consideration the following information in support of its claim that Unit 1 meets the intent of the Rule.

#### ***1.3.1.2 Collective Operating Experience of the Three BFN Units***

BFN Unit 1 was licensed and began initial operation in 1973. Unit 2 began operation in 1974. Units 1 and 2 operated until March 22, 1975, at which time both units were shut down due to a fire in the Unit 1 reactor building. Units 1 and 2 resumed operation in 1976, and Unit 3 began initial operation in 1977. All three units were operated until March 1985, at which time the applicant voluntarily shut them down to address regulatory and management issues.

Following successful resolution of the management issues and the Unit 2 and common regulatory issues, Unit 2 was restarted on May 23, 1991. Unit 3 remained in a layup/recovery mode for approximately 10 years and, following resolution of the Unit 3 regulatory issues, Unit 3 was restarted on November 19, 1995. Both Units 2 and 3 have operated with high capacity factors into the present time. In the early 1990s, the applicant decided to defer the restart of Unit 1.

On May 16, 2002, the applicant announced the Unit 1 Restart Project. As part of the restart project, the applicant is performing the same restart programs and implementing the same modifications that were previously completed on Units 2 and 3. At restart, Unit 1 will be operationally the same as Units 2 and 3. Based only on the periods of operation as of 2005, Unit 1 has operated for approximately 10 calendar years, Unit 2 has operated for approximately 23 calendar years and Unit 3 has operated for approximately 18 calendar years.

All three BFN units share common facilities, materials, and environments. The three units are identical General Electric BWR 4 reactors with Mark I containments. TVA designed and constructed the units to be materially and operationally identical, with identical systems, components, materials, and environments. For a given power level, the system process conditions (e.g., pressure, temperatures, moisture content, chemical properties, flow rates, velocities, etc.) are identical. There is one UFSAR for the three units. Operating procedures and Technical Specifications are nearly identical. Due to outage scheduling, small unit differences may exist for short periods of time but are eliminated as modifications are installed on other units during subsequent unit outages. Thus, over 51 years of operating experience is accumulated collectively by the three units and this collective experience has been used to support the preparation of the three-unit license renewal application. Addressing stakeholders' questions when the Rule was published in 1991, the SOC states that the licensees and the

NRC can substitute nuclear industry operating experience for plant-specific experience, and the staff need not limit its safety finding to information developed solely from plant-specific experience of an applicant. Therefore, the collective 51 years experience is sufficient to support the renewal of the BFN Unit 1 operating license, because the Unit 2 operating experience, along with the experience during the ten-year extended layup and subsequent operation of BFN Unit 3, applies to Unit 1. Specifically, in pursuing license renewal for BFN Unit 1, TVA has relied not only on Unit 1's CLB, including the specific changes in Appendix F of the LRA, but also on Unit 1's plant-specific operating experience, the operating experience gained from BFN Units 2 and 3, and relevant industry-wide operating experience. This experience base satisfies and is consistent with the regulatory requirements and intent of 10 CFR 54.17(c).

#### ***1.3.1.3 Corrective Action Program (CAP) Applicability***

In its submittal dated January 31, 2005, TVA stated that the three BFN units are essentially identical, and the application is not unit-specific regarding aging management programs. The changes being implemented as part of Unit 1 restart activities are consistent with the changes made previously to Units 2 and 3. AMPs are common for all three units based on their CLB. Since at restart the Unit 1 licensing basis will be consistent with that of Units 2 and 3, the aging management programs specified will be applicable to all three units. In addition to the similarities between the Units 2 and 3 and Unit 1 licensing and design bases, specific programs function such that relevant Units 2 and 3 operating experience is passed on to Unit 1. First, the Corrective Action Program (CAP) applies to all TVA organizations involved in nuclear power activities. This program is not unit specific and, as applicable, a condition identified at any BFN unit is reviewed for generic implications potentially applicable to the other units. TVA also has an administrative procedure for the review and dissemination of operating experience obtained from both external and internal sources. This procedure requires screening of such information for potential BFN applicability. This information is received from sources such as NRC Information Notices, Institute of Nuclear Power Operations (INPO), nuclear steam supply system (NSSS) vendor reports/notices, and in-house operating experience. If an item is determined to be applicable to BFN, then the information is addressed in the CAP. Thus, these programs help ensure that relevant operating experience (OE) is applied to all three units.

#### ***1.3.1.4 Aging Mechanism Similarities Between Units after Layup and Recovery***

During the collective periods of BFN operation, including recovery, the three units have experienced similar aging mechanisms. For example, each unit has experienced the expected wear such as Flow Accelerated Corrosion (FAC), general corrosion, and microbiologically induced corrosion (MIC). Applicable aging mechanisms for the passive plant features are identified in LRA Section 3.0. The aging mechanisms for the passive plant features are well known and are addressed by existing plant programs and procedures.

Since components and structures within the scope of AMRs for the three units contain the same materials and have experienced the same process conditions, all three units experience similar aging effects. Unit 1 has been shut down since 1985. During the shutdown period, it experienced aging effects analogous to those experienced on Units 2 and 3 during their shutdown periods. In this regard, the applicant has utilized the OE gained from restarting and operating Units 2 and 3, in recovering Unit 1, and has undertaken proactive steps to use the aging mechanisms experienced during subsequent operation of Units 2 and 3 to determine the

necessary modifications to Unit 1 to preclude aging effects when possible. In many cases, the aging mechanisms such as FAC had not resulted in significant wear in Unit 1; however, the recovery effort has replaced the FAC-susceptible material with FAC-resistant material. The Unit 1 locations for replacements were expanded to address additional locations with geometry/process conditions similar to Units 2 and 3 wear locations even if Units 2 and 3 had not experienced significant wear in all similar locations. For example, if Unit 2 had experienced wear at one elbow, but not at two other elbows of similar material/geometry/process conditions, the Unit 1 restart scope included all 3 locations. The Unit 1 recovery design changes have not resulted in the installation of types of material different from those present in Units 2 and 3. Thus, during the collective periods of BFN operation, including recovery, the three units have experienced similar aging mechanisms and will be appropriately managed during the period of extended operations.

#### ***1.3.1.5 Plant Upgrades***

As part of the recovery of Units 2 and 3, TVA implemented various plant upgrades (i.e., design changes) in response to regulatory issues and/or to improve plant operating characteristics. This upgrade experience has been brought to bear in the Unit 1 recovery effort. For example, as part of the recovery of Units 2 and 3, TVA replaced piping that was susceptible to intergranular stress corrosion cracking (IGSCC). Similar design changes are being installed on Unit 1 as part of the recovery process. IGSCC-susceptible piping in the reactor recirculation, residual heat removal (RHR), reactor water cleanup (RWCU), and core spray (CS) systems on Unit 1 is being replaced using materials that are resistant to IGSCC. (Also, see the beginning of SER Section 3.7)

The applicant stated that it has effectively managed aging through various programs and has replaced and upgraded the plant to manage the effects of aging. For example, the systems susceptible to FAC are monitored in accordance with EPRI guidelines (LRA Section B.2.1.15, SER Section 3.0.3.2.9). Piping on Units 2 and 3 is monitored for FAC-induced wear and replaced as needed. In many cases, the piping has been replaced with FAC-resistant chrome molybdenum piping (LRA Section B.2.1.15, SER Section 3.0.3.2.9). Reactor vessel components such as the shroud, vessel welds, jet pumps, core plate, and top guide are inspected by accepted industry standards such as the Boiling Water Reactor Vessel Internals Program (BWRVIP) and repairs/replacements performed as required (LRA Section B.2.1.12, SER Section 3.0.3.2.7). Raw water piping that is used to transfer heat from SR systems to the ultimate heat sink is managed by the Open Cycle Cooling Water System Program (LRA Section B.2.1.17, SER Section 3.0.3.2.11). The primary containment liner is inspected in accordance with American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, Subsection IWE for steel containments (Class MC) requirements (LRA Section B.2.1.31, SER Section 3.0.3.1.9). As explained in the LRA, these same programs are used on all three units.

#### ***1.3.1.6 Inspections/Programs Expanded to Proactively Prevent Age Related Wear***

In its submittal dated November 16, 2005, TVA stated that the Unit 1 inspections/programs for other aging mechanisms have been expanded to proactively prevent age-related wear. The scope of replacement of IGSCC-susceptible piping is significantly larger in Unit 1 than in Units 2 or 3; thus, Unit 1 will contain a significantly larger scope of new pipe that has no pre-existing

aging effects. Since similar materials and geometry were used in Unit 1 for the expanded scope, there were no new aging mechanisms introduced. In addition, the Unit 1 systems that perform a required function in the defueled condition, or that directly support the operation of Unit 2 or Unit 3, have been continuously operated and maintained under applicable Technical Specifications and plant programs since shutdown in 1985. This OE has been factored into the LRA. Examples of these piping systems include portions of fuel pool cooling and cleanup (FPC), control rod drive (CRD), raw cooling water (RCW), reactor building closed cooling water (RBCCW), RHR, residual heat removal service water (RHRSW), EECW, and control air systems.

The applicant has maintained the Unit 1 systems in a physical condition during shutdown similar to those of Units 2 and 3 during their shutdown periods. The internal operating conditions (e.g., water chemistry, flow rate, temperature, etc.) for these systems are the same as those found in the operating units. These systems have experienced the same aging mechanisms and rates as experienced by the similar Units 2 and 3 systems for shutdown conditions. The Units 1, 2, and 3 reactor buildings are one continuous structure, and the external operating environments of the systems are the same. Even though Unit 1 was in an extended outage, the overall environmental conditions affecting external surfaces in Unit 1 were maintained consistent with those of Units 2 and 3. Unit 1 had the normal ventilation systems in service, and equipment was maintained to prevent system leakage so that the equipment was not subjected to aggressive external conditions.

Other Unit 1 systems have been in a layup condition, and this prior layup experience has been applied to Unit 1 license renewal. For example, Unit 1 was placed in layup using the same philosophy, processes, and conditions as used for Unit 3. Some piping systems (or portions of piping systems) were placed into a "wet layup" under TVA's Unit 1 layup procedure, which include RV, RCS, RWCU, portions of RHR, CS, and feedwater (FW) systems. The water chemistry within these Unit 1 piping systems was monitored for compliance with the water quality requirements. Thus, it would not be expected that a different aging mechanism or rate would exist in wet layup compared to what would have occurred if the systems were in normal operation. The full scope of BWRVIP inspections have been performed on the Unit 1 reactor vessel as part of the restart project. No adverse effects from the layup period were found, and repairs/ replacements not related to layup will be performed as required. The reactor water recirculation system and reactor water cleanup system piping, both large bore and small bore, have been replaced. The RHR and CS piping that was in wet layup has also been replaced. The piping was replaced with the same materials that were used in Units 2 and 3. Ultrasonic inspections of the FW piping have confirmed that the piping does not exhibit adverse effects from the wet layup period. Thus, extensive layup experience has been applied to the Unit 1 license renewal.

Some Unit 1 piping systems (or portions of piping systems) were drained and placed in dry layup, which included reactor core isolation cooling (RCIC), high pressure coolant injection (HPCI), main steam (MS), RHR, CS, and FW systems. The exterior of the system/component was maintained at nominal reactor or turbine buildings ambient conditions, which would have been the same in Units 1, 2, and 3. Thus, the dry layup systems would have experienced aging at a rate less than or equal to that of the corresponding Unit 2/3 system.

Some Unit 1 systems were simply drained with no controlled environment. As a result, portions of two Unit 1 systems experienced accelerated aging. The accelerated aging of these systems

was previously identified as part of the OE from the Unit 3 outage between 1985 and 1995. These were portions of the Unit 1 RHRSW piping inside the reactor building and some small bore raw cooling water piping. As explained in the beginning of SER Section 3.7, Units 2 and 3 OE was incorporated into Unit 1 aging management activities.

As stated previously, all units met the regulatory requirement and no plant-specific exemptions were required per 10 CFR 54.17(c). However, the staff questioned the applicant's statement of the operating experience applicability from Units 2 and 3 to Unit 1 and are not entirely satisfied that Unit 1 operating experience meets the intent of the Rule. The staff concludes that the Unit 1 Periodic Inspection Program will be an acceptable mitigative action and compensate for the lack of operating experience in meeting the intent of the Rule.

### **1.3.2 License Renewal at Currently Licensed Power Level**

Part 54 of 10 CFR describes the requirements for renewing operating licenses for nuclear power plants. The staff performed its technical review of the LRA in accordance with Commission guidance and the requirements of 10 CFR Part 54. Section 54.29 of 10 CFR sets forth the standards for renewing a license. This SER describes the results of the staff's safety review. The staff while performing the safety review limited its safety finding to matters related to the CLB and at the currently authorized power levels for which the units are licensed. These power levels are indicated in Section 1.1 of this SER's Introduction and General Discussion. Even though the applicant's original submittal dated December 31, 2003, included a renewal request at extended power uprate (EPU) conditions for the three BFN units, the applicant by its letter dated January 7, 2005, requested decoupling the power uprate request from the LRA. In that submittal the applicant requested that the staff complete the review based on the current licensed power level for each of the three units and address separately the EPU conditions after the renewed licenses are approved. Hence all the safety findings and staff evaluations apply to the currently authorized power levels for which each of the BFN units are currently licensed.

### **1.3.3 Integration of Unit 1 Restart Modification**

Ever since March 1985, Unit 1 has been on administrative hold and the applicant has committed not to restart Unit 1 without prior approval from the staff. The applicant is currently planning to restart Unit 1 in 2007. The element unique to Unit 1 is that restart activities include modifying the Unit 1 licensing basis to make it consistent with the CLB of Units 2 and 3. During the meetings with the staff during 2003, it was agreed the applicant would identify in the LRA the Unit 1 differences that will be eliminated when restart activities are completed. To highlight these differences, information not yet applicable to Unit 1 was marked with bolded border. This annotation methodology is consistent with previous multi-plant LRAs submitted to the staff. LRA Appendix F describes each of these differences, its effect on the application, the schedule for resolution, and provides references to application sections affected. This enables the applicant to submit an LRA based on the CLB for all three units, as well as to identify Unit 1 restart activities relevant to the LRA. The changes are being implemented as part of Unit 1 restart activities consistent with the changes made previously to Units 2 and 3. Thus, the applicant states that the BFN units are essentially identical, and the application is not unit-specific with regard to AMPs or the AMRs.

### 1.3.4 Other Regulatory Requirements

In 10 CFR 54.19(a), the NRC requires a license renewal applicant to submit general information. The applicant provided this general information in LRA Section 1, which it submitted by letter dated December 31, 2003.

In 10 CFR 54.19(b), the NRC requires that each LRA include “conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license.” The applicant stated the following in the LRA regarding this issue:

TVA requests that, as appropriate, conforming changes be made to the Article VII of the indemnity agreement, and item 3 of the Attachment to the agreement, specifying the extension agreement until the expiration date of the renewed facility operating licenses as sought in the application.

The staff intends to make conforming changes to the indemnity agreement so that the requirements of 10 CFR 54.19(b) will be met.

In 10 CFR 54.21, the NRC requires that each LRA must contain: (a) an IPA, (b) a description of any CLB changes that occurred during the staff review of the LRA, (c) an evaluation of TLAAs, and (d) an FSAR or a UFSAR supplement. Sections 3 and 4 and LRA Appendix B address the license renewal requirements of 10 CFR 54.21(a), (b), and (c). LRA Appendix A contains the license renewal requirements of 10 CFR 54.21(d).

In 10 CFR 54.21(b), the NRC requires that each year following submission of the LRA, and at least three months before the scheduled completion of the staff’s review, the applicant must submit an amendment to the renewal application that identifies any changes to the CLB of the facility that materially affect the contents of the LRA, including the UFSAR supplement. The applicant submitted an update to the LRA by letter dated January 31, 2005, which summarized the changes to the CLB that have occurred during the staff’s review of the LRA. This submission satisfies the requirements of 10 CFR 54.21(b) and is still under staff review.

In accordance with 10 CFR 54.22, an applicant's LRA must include changes or additions to the technical specifications (TSs) that are necessary to manage the effects of aging during the period of extended operation. In LRA Appendix D, the applicant stated that it had not identified any TS changes necessary to support issuance of the renewed operating licenses for BFN.

The staff evaluated the technical information required by 10 CFR 54.21 and 10 CFR 54.22 in accordance with NRC regulations and the guidance provided by the SRP-LR. SER Sections 2, 3, and 4 document the staff’s evaluation of the technical information contained in the LRA.

As required by 10 CFR 54.25, the ACRS will issue a report to document its evaluation of the staff’s LRA review and associated SER. SER Section 5 will incorporate the ACRS report once it is issued. SER Section 6 will document the findings required by 10 CFR 54.29.

The final plant-specific supplement to the GEIS was issued on June 23, 2005, and documents the staff’s evaluation of the environmental information required by 10 CFR 54.23.

## 1.4 Interim Staff Guidance

The license renewal program is a living program. The NRC staff, industry, and other interested stakeholders gain experience and develop lessons learned with each renewed license. The lessons learned address the staff's performance goals of maintaining safety, improving effectiveness and efficiency, reducing regulatory burden, and increasing public confidence. Interim staff guidance (ISG) is documented for use by the staff, industry, and other interested stakeholders until it is incorporated into the license renewal guidance documents such as the SRP-LR and the GALL Report.

The following table provides the current set of ISGs issued by the staff, as well as the SER sections in which the staff addresses ISG issues.

<b>ISG Issue (Approved ISG No.)</b>	<b>Purpose</b>	<b>SER Section</b>
GALL Report presents one acceptable way to manage aging effects <b>(ISG-1)</b>	This ISG clarifies that the GALL Report contains one acceptable way, but not the only way, to manage aging for license renewal.	N/A
SBO Scoping <b>(ISG-2)</b>	<p>The license renewal rule 10 CFR 54.4(a)(3) includes 10 CFR 50.63(a)(1)—SBO.</p> <p>The SBO rule requires that a plant must withstand and recover from an SBO event. The recovery time for offsite power is much faster than that of EDGs.</p> <p>The offsite power system should be included within the scope of license renewal.</p>	2.1.3
Concrete AMP <b>(ISG-3)</b>	Lessons learned from the GALL demonstration project indicated that GALL is not clear on whether concrete requires an AMP.	3.5.2.2.8

ISG Issue (Approved ISG No.)	Purpose	SER Section
<p>FP System Piping <b>(ISG-4)</b></p>	<p>This ISG clarifies the staff position for wall-thinning of the FP piping system in GALL AMPs XI.M26 and XI.M27.</p> <p>The staff's new position is that there is no need to disassemble FP piping, as disassembly can introduce oxygen to FP piping, which can accelerate corrosion. Instead, a non-intrusive method, such as volumetric inspection, should be used.</p> <p>Testing of sprinkler heads should be performed at year 50 of sprinkler system service life, and every 10 years thereafter.</p> <p>This ISG eliminates the Halon/carbon dioxide system inspections for charging pressure, valve line-ups, and the automatic mode of operation test from GALL; the staff considers these test verifications to be operational activities.</p>	<p>3.0.3.2.17</p>

ISG Issue (Approved ISG No.)	Purpose	SER Section
<p>Identification and Treatment of Electrical Fuse Holders <b>(ISG-5)</b></p>	<p>This ISG includes electrical fuse holders AMR and AMP (i.e., same as terminal blocks and other electrical connections).</p> <p>The position includes only fuse holders that are not inside the enclosure of active components (e.g., inside of switchgears and inverters).</p> <p>Operating experience finds that metallic clamps (spring-loaded clips) have a history of age-related failures from aging stressors such as vibration, thermal cycling, mechanical stress, corrosion, and chemical contamination.</p> <p>The staff finds that visual inspection of fuse clips is not sufficient to detect the aging effects from fatigue, mechanical stress, and vibration.</p>	<p>2.1.3.2.3 3.6.2.3.1</p>
<p>Scoping for fire protection equipment <b>(ISG-7)</b></p>	<p>This ISG provides clarification of the fire protection systems, structures, and components scoping to whether the scope would expand to include (BTP) APSCB 9.5-1</p>	<p>2.1.3.1.2</p>
<p>The ISG Process <b>(ISG-8)</b></p>	<p>This ISG provides clarification and update to the ISG process on Improved License Renewal Guidance Documents.</p>	<p>N/A</p>

ISG Issue (Approved ISG No.)	Purpose	SER Section
Standardized Format for License Renewal Applications (ISG-10)	The purpose of this ISG is to provide a standardized license renewal application format for applicants.	N/A

## 1.5 Summary of Open Items

As a result of its review of the LRA, including additional information submitted to the staff through June 15, 2005, the staff identified the following open items (see below). An issue is considered open if the applicant has not presented a sufficient basis for resolution. Each open item (OI) has been assigned a unique identifying number.

### **OI-2.4-3:** (Section 2.4 - Drywell Shell Corrosion)

Supplement 1 of Information Notice (IN) 86-99 indicates that, if leakage from the flooded reactor cavity is not monitored and managed, there is a potential for corrosion of the cylindrical portion of drywell shell. As this corrosion would initiate in the non-inspectible areas of the drywell, it cannot be monitored by IWE inspections. Moreover, this degradation of drywell shell can occur even if there is very little water found in the sand-pocket area of the drywell. Thus, the reactor building to drywell refueling seal becomes a non-safety-related (NSR) item that can affect the integrity of the drywell shell (which is a pressure boundary component) during the period of extended operation, and falls under the requirement of 10 CFR 54.4(a)(2). For two BWR plants, the staff accepted an alternative to managing the aging of the seal. The alternative is to periodically perform ultrasonic testing (UT) of the cylindrical portion of the drywell shell with an acceptable sampling program, as part of containment inservice inspection (ISI) program. After reviewing the response to RAI 3.5-4 (in the applicant's letter dated January 31, 2005) related to the operating experience of drywell shell corrosion at all three units, the staff came to the conclusion that the applicant should manage the aging (leakage) of refueling seals, therefore, this is identified as OI 2.4-3.

The applicant responded to OI 2.4-3 by letter dated May 31, 2005. BFN did not include the refueling seals at the top of the drywell in the scope of license renewal and provided the following technical basis for that conclusion: The drywell-to-reactor building refueling seal and the reactor pressure vessel (RPV)-to-drywell refueling seal, in conjunction with the refueling bulkhead, provide a watertight barrier to permit flooding above the RPV flange while preventing water from entering the drywell. Providing a watertight barrier to permit flooding above the RPV flange in support of refueling operations is an NSR function. In 10 CFR 54.4(a), the criteria that determine whether plant systems, structures, and components are within the scope of license renewal are set forth. The refueling seals do not satisfy any of the requirements set forth in 10 CFR 54.4(a)(1). The refueling seals are NSR, and they are not relied upon to remain functional during design basis events. Thus, the refueling seals are not brought within the scope of license renewal by 10 CFR 54.4(a)(1).

In a letter dated November 16, 2005, the applicant stated that for Unit 1 it will perform one-time confirmatory ultrasonic thickness measurements on the vertical cylindrical area immediately below the drywell flange. For Units 2 and 3, it will perform the same testing in the portion of the cylindrical section of the drywell in a region where the liner plate is 0.75 inches thick. This will provide a bounding condition since the nominal thickness of the wall in this region has the least margin. The applicant committed to perform these ultrasonic thickness measurements prior to the Unit 1 restart, and prior to the period of extended operation for Units 2 and 3. The staff found this acceptable; therefore, OI 2.4-3 is closed.

**OI-4.7.7:** (Section 4.7.7 - Stress Relaxation of the Core Plate Hold-Down Bolts)

In LRA Section 4.7.7, the loss of preload of the core plate hold-down bolts due to thermal and irradiation effects was evaluated in accordance with the requirements of 10 CFR 54.21(c)(1)(ii). For the 40-year lifetime, the Boiling Water Reactor Vessel and Internals Project (BWRVIP)-25 concluded that all core plate hold-down bolts will maintain some preload throughout the life of the plant. For the period of extended operation, the expected loss of preload was assumed to be 20 percent, which bounds the original BWRVIP analysis that was prepared to bound the majority of plants, including BFN units after operating for 20 additional years. With a loss of 20 percent in preload, the core plate will maintain sufficient preload to prevent sliding under both normal and accident conditions. Based on this assumption, the applicant concluded that the loss of preload is acceptable for the period of extended operation.

In RAIs 4.7.7-1, 4.7.7-2, and follow ups, the staff requested the applicant to demonstrate how the BWRVIP-25 analysis can be applied to the BFN units based on the configuration and the geometry of core plate hold-down bolts and the reactor environment (temperature and neutron fluence) assumed in the original report. In its letter dated September 6, 2005, the applicant provided the vendor's plant-specific calculations that will validate the assumptions as stated above. However, the staff found that the methodology used did not follow the staff's approved BWRVIP-25 analysis; therefore, it requested additional information. In its letter dated November 16, 2005, the applicant provided supplemental responses and identified several of the staff's concerns raised during a teleconference on October 18, 2005. The applicant took the staff's comments under advisement and committed to perform a plant-specific analysis consistent with BWRVIP-25. This analysis will be submitted for the staff's review two years prior to the period of extended operation. The staff considers this acceptable; therefore, OI 4.7.7 is closed.

**OI-3.0-3 LP:** (Section 3.0 - B.2.1.42, Unit 1 Periodic Inspection Program)

During the 526<sup>th</sup> meeting of the Advisory Committee on Reactor Safeguards, October 6-7, 2005, the ACRS reviewed the LRA for the BFN Units 1, 2, and 3, and the associated SER with open items prepared by the staff. Though the Committee agreed with the staff that periodic inspections of systems and components that were not replaced are appropriate and necessary, it was not clear which systems will be included in the scope of the Unit 1 Periodic Inspection Program, since no further attributes of this future program have been provided in the SER. The main attributes of the program, including the intended scope, need to be defined in the final SER. The Committee stated that periodic inspections are the most significant compensating actions for the lack of plant-specific operating experience of BFN Unit 1 and it was not possible to judge the adequacy of this important program since insufficient information has been provided. As a result of the Committee's review, the staff elevated this issue from a

confirmatory item to an open item and requested the applicant to provide details of the periodic inspection program prior to issuance of the final SER. This is open item 3.0.3.

When the staff briefed the Committee on the SER with open items during the October 5-6, 2005 meeting, it omitted a description of this new plant-specific program called "B.2.1.42 - Unit 1 Periodic Inspection Program." The SER described the staff's review of information submitted to the NRC through June 15, 2005, the cutoff date for consideration in the SER with open items. Staff has since received details of this AMP titled, "B.2.1.42 - Unit 1 Periodic Inspection Program." The staff review and evaluation of the program is included in this final version of the SER in Section 3.0.3.3.5. This closes open item 3.0.3.

## **1.6 Summary of Confirmatory Items**

As a result of the staff's review of the LRA for BFN, including additional information and clarifications submitted to the staff through June 15, 2005, the staff identified the following confirmatory items (CIs). An issue is considered confirmatory if the staff and the applicant have reached a satisfactory resolution, but the resolution has not yet been formally submitted to the staff. Each CI has been assigned a unique identifying number. The items identified in this section have been properly closed by the technical staff.

### **CI 3.3.2.35-1:** (Section 3.3 Bolting in Auxiliary Systems)

For auxiliary system closure bolting, the staff was concerned that cracking and loss of preload are not entirely addressed by either the American Society of Mechanical Engineers (ASME) Code Section XI Subsections IWB, IWC, and IWD Inservice Inspection Program or Bolting Integrity Program. Although ASME Section XI requires bolt torquing loads to be in accordance with ASME Section III for replacement of Class 1 and 2 bolting, no bolt torquing requirements are specified for Class 3 bolting, NSR bolting or bolting that is reused after being removed for maintenance. The staff raised these issues in RAI 3.3.32.35-1.

The staff reviewed the applicant's response dated March 16, 2005, and found the response to be reasonable and acceptable. The applicant provided additional information to clarify that cracking and loss of preload in bolting are being effectively managed. However, the response did not provide the results of any self assessments, inspections, or maintenance activities, and operating experience to determine if closure bolting in auxiliary systems was effectively managed at BFN for cracking and loss of preload. The staff discussed this issue with the applicant in a teleconference, and the verification of this confirmatory item was addressed during the AMP inspection performed on September 2005. In the inspection report, letter dated November 7, 2005, the staff concluded that the bolting practices in BFN are functioning adequately; therefore, CI 3.3.2.35-1 is closed.

### **CI-B.2.1.36** (Section B.2.1.36, Structures Monitoring Program)

The staff had a follow-up question in a May 4, 2005, teleconference regarding evaluation of inspection personnel qualification based on industry guidance, the American Concrete Institute (ACI) 349.3R-96 as stated in the Structures Monitoring Program. The staff stated that this industry guidance alone will not be adequate to qualify the inspectors for the examination of steel supports for the Structures Monitoring Program. The staff requested that the applicant reevaluate the program element from previous staff positions and submit the description for

staff review. In its response to a follow up to RAI B.2.1.33-1, by letter dated May 31, 2005, the applicant responded to the staff's question and committed (letter dated December 12, 2005) to manage the aging effects of Class MC supports under ASME Code Section XI Subsection IWF. The applicant also agreed to include the inspector's qualification in accordance with the requirements of ASME Code Section XI Subsection IWF and not per the BFN Structures Monitoring Program. The staff found this acceptable; therefore, CI-B.2.1.36 is closed.

## **1.7 Summary of Proposed License Conditions**

As a result of the staff's review of the LRA, including subsequent information and clarifications provided by the applicant, the staff identified four proposed license conditions.

The first license condition requires the applicant to include the UFSAR supplement required by 10 CFR 54.21(d) in the next UFSAR update, as required by 10 CFR 50.71(e), following the issuance of the renewed licenses.

The second license condition requires the future activities identified in the FSAR supplement to be completed prior to entering the period of extended operation.

The third license condition requires the implementation of the most recent staff-approved version of the Boiling Water Reactor Vessels and Internals Project (BWRVIP) Integrated Surveillance Program (ISP) as the method to demonstrate compliance with the requirements of 10 CFR Part 50, Appendix H. Any changes to the BWRVIP ISP capsule withdrawal schedule must be submitted for NRC staff review and approval. Any changes to the BWRVIP ISP capsule withdrawal schedule which affects the time of withdrawal of any surveillance capsules must be incorporated into the licensing basis. If any surveillance capsules are removed without the intent to test them, these capsules must be stored in a manner which maintains them in a condition which would support re-insertion into the reactor pressure vessel, if necessary.

The fourth license condition is satisfactory completion of the thirteen Unit 1 restart commitments that are discussed in LRA Appendix F (see SER Section 2.6). Successful completion of these restart activities provides a necessary regulatory framework for review of the LRA and is a staff assumption fundamental throughout the staff safety review. When completed, the CLB of Unit 1 will be consistent with the CLB of Units 2 and 3. Completion of these activities is a condition to be met prior to power operations of Unit 1.

## **SECTION 2**

### **STRUCTURES AND COMPONENTS SUBJECT TO AGING MANAGEMENT REVIEW**

#### **2.1 Scoping and Screening Methodology**

##### **2.1.1 Introduction**

Title 10 of the *Code of Federal Regulations*, Part 54 (10 CFR Part 54), "Requirements for Renewal of Operating Licenses for Nuclear Power Plants," Section 54.21, "Contents of Application — Technical Information," requires that each application for license renewal contain an integrated plant assessment (IPA). Furthermore, the IPA must list and identify those structures and components that are subject to an aging management review (AMR) from the systems, structures, and components (SSCs) that are within the scope of license renewal in accordance with 10 CFR 54.4. LRA Sections 2.1.4 and 2.1.5 of the license renewal application (LRA) describe the applicant's process for identifying these structures and components (SCs) and provide the scoping and screening results for those components, subcomponents, structural members, and commodity groups that are subject to an AMR in accordance with LRA Section 3.0.

In LRA Section 2.1, "Scoping and Screening Methodology," the applicant described the scoping and screening methodology used to identify SSCs at the Browns Ferry Nuclear Plant (BFN) within the scope of license renewal and SCs that are subject to an AMR. The staff reviewed the applicant's scoping and screening methodology to determine if it meets the scoping requirements stated in 10 CFR 54.4(a) and the screening requirements stated in 10 CFR 54.21.

In developing the scoping and screening methodology, the applicant considered the requirements of the Rule, the Statement of Consideration (SOC) for the Rule, and the guidance presented by the Nuclear Energy Institute (NEI), "Industry Guideline for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule," Revision 3, March 2001, (NEI 95-10). In addition, the applicant considered the Nuclear Regulatory Commission (NRC) staff's correspondence with other applicants and with the NEI in the development of this methodology. Scoping and screening were performed as an integrated review at the system/structure level. Screening was performed on a component-level basis, and the scoping results were reviewed and revised as required to be consistent with the screening results. The short-lived passive components that could be excluded from an AMR on the basis of a qualified life or a specified replacement time period were identified and screened out as part of the AMR process.

##### **2.1.2 Summary of Technical Information in the Application**

In LRA Sections 2.0 and 3.0, the applicant provided the technical information required by 10 CFR 54.21(a). In LRA Section 2.1, "Scoping and Screening Methodology," the applicant described the process used to identify the SSCs that meet the license renewal scoping criteria under 10 CFR 54.4(a), as well as the process used to identify the SCs that are subject to an AMR as required by 10 CFR 54.21(a)(1). LRA Section 2.1.2 discusses the application of the

10 CFR 54.4(a) scoping criteria; Section 2.1.3 provides a discussion of the documentation that was used to perform scoping and screening; and LRA Sections 2.1.4 and 2.1.5 describe the scoping and screening methodology.

Additionally, LRA Section 2.2, "Plant-Level Scoping Results"; Section 2.3, "Scoping and Screening Results: Mechanical Systems"; Section 2.4, "Scoping and Screening Results: Structures"; and Section 2.5, "Scoping and Screening Results: Electrical and Instrumentation and Control Systems" amplify the process the applicant used to identify the SCs that are subject to an AMR. LRA Section 3, "Aging Management Review Results," contains the following information:

- Section 3.1, "Aging Management of Reactor Vessel, Internals, and Reactor Coolant System"
- Section 3.2, "Aging Management of Engineered Safety Features Systems"
- Section 3.3, "Aging Management of Auxiliary Systems"
- Section 3.4, "Aging Management of Steam and Power Conversion Systems"
- Section 3.5, "Aging Management of Containment, Structures and Component Supports"
- Section 3.6, "Aging Management of Electrical and Instrumentation and Controls"

LRA Section 4, "Time-Limited Aging Analyses," contains the applicant's identification and evaluation of time-limited aging analyses (TLAAs).

#### **2.1.2.1 Scoping Methodology**

In LRA Section 2.1, the applicant described the methodology used to scope systems and structures pursuant to the requirements of 10 CFR 54.4(a). The applicant identified differences between the current licensing basis (CLB) for Unit 1 and the CLB for Units 2 and 3, and documented them in LRA Appendix F. The applicant stated that the differences between CLBs will be resolved before the restart of Unit 1, so that the CLB for Unit 1 will be consistent with Units 2 and 3. The applicant's scoping methodology, as described in the LRA, is outlined in the sections below.

##### **2.1.2.1.1 Application of the Scoping Criteria in 10 CFR 54.4(a)**

The applicant described the general approach to scoping SSCs that are safety-related (SR), nonsafety-related (NSR) affecting SR, or credited with demonstrating compliance with certain regulated events in LRA Section 2.1.2, "Application of Scoping Criteria in 10 CFR 54.4(a)." The scoping approaches specific to each of the three 10 CFR 54.4(a) scoping criteria are described in the following sections.

Application of the Scoping Criteria in 10 CFR 54.4(a)(1). In LRA Section 2.1.2.1, "10 CFR 54.4(a)(1) - Safety-Related," the applicant discussed the scoping methodology as it relates to SR criteria in accordance with 10 CFR 54.4(a)(1). With respect to the SR criteria, if one or more of the three SR criteria were met, the applicant determined that the function was an SR intended function, and included the corresponding SR SSCs within the scope of license renewal that are relied upon to remain functional during and following/ a design basis event

(DBE) as defined in 10 CFR 50.49(b)(1) and are based on reviews of plant accident analyses and evaluations.

Application of the Scoping Criteria in 10 CFR 54.4(a)(2). In LRA Section 2.1.2.2, “10 CFR 54.4(a)(2) - Nonsafety-Related SSCs Whose Failure Could Prevent Satisfactory Accomplishment of Safety-Related Functions,” the applicant discussed the methodology used to identify SSCs meeting the 10 CFR 54.4(a)(2) NSR license scoping criteria. Specifically, the applicant considered the following SSCs to be in the scope of 10 CFR 54.4(a)(2):

- SCs, such as pipe whip restraints, that provide protection to SR SSCs to be in the scope of 10 CFR 54.4(a)(1) rather than 10 CFR 54.4(a)(2) SSCs
- Liquid-filled NSR SSCs directly connected to SR SSCs
- NSR SSCs that are not directly connected to SR structures such as, reactor buildings, primary containment structures
- NSR air/gas and heating, ventilation, and air conditioning (HVAC) systems that could prevent the satisfactory accomplishment of an SR function

In LRA Section 2.1.2.2, the applicant described the methods and rationale used to scope each of the above categories of NSR SSCs in the LRA. The applicant’s review encompassed the DBEs considered in these documents. The NSR SSCs already included within the scope of license renewal for 10 CFR 54.4(a)(3) were not identified for inclusion under 10 CFR 54.4(a)(2).

Application of the Scoping Criteria in 10 CFR 54.4(a)(3). In LRA Sections 2.1.2.3, “10 CFR 54.4(a)(3) - The Five Regulated Events,” and 2.1.3.4, “Specific Scoping Documents for Regulated Events,” the applicant discussed the methodology used to identify SSCs credited in performing a function that demonstrates compliance with regulations for fire protection, environmental qualification (EQ), anticipated transient without scram (ATWS), and station blackout (SBO) pursuant to 10 CFR 54.4(a)(3) license renewal scoping criteria. The applicant did not address pressurized thermal shock (PTS) because Browns Ferry units are boiling water type reactors to which this criterion does not apply.

#### 2.1.2.1.2 Documentation Sources Used for Scoping and Screening

In LRA Section 2.1.3, “Documentation Sources Used for Scoping and Screening,” the applicant listed sources that were used as input during the license renewal scoping and screening process:

- updated final safety analysis report (UFSAR)
- safe shutdown analysis (SSA) calculation
- Maintenance Rule documentation
- CLB and design-basis documents (design criteria documents and calculations, qualitative assessments and analyses, quantitative computations)
- controlled plant component database (also known as enterprise maintenance planning and control (EMPAC))
- site drawings

The applicant stated that these sources were used to identify the functions performed by plant systems and structures. These functions were then compared to the scoping criteria in 10 CFR 54.4(a)(1)-(3) to determine if the associated plant system or structure performed a license renewal intended function. These sources were also used to develop the list of structures and components subject to an AMR.

#### 2.1.2.1.3 Plant and System Level Scoping

In LRA Section 2.1.4, "Scoping Methodology," the applicant stated that the scoping methodologies used to identify mechanical, electrical, and instrumentation and control (I&C) systems and structures were described under the respective disciplines. In general, the applicant created a list of systems and structures from the EMPAC, site drawings, and the structures' design documents, UFSAR, Maintenance Rule documents, and other plant design documents. The methodologies for individual disciplines are discussed below.

Mechanical Component Scoping. In LRA Section 2.1.4.1, the applicant described the scoping methodology for components within SR and NSR mechanical systems. For every mechanical system, the applicant applied the following scoping process: (1) identify system intended functions, (2) determine system evaluation boundary, and (3) create license renewal drawings. The applicant used information from the SSA calculation, the UFSAR, and other applicable documents to identify those systems that perform intended functions as defined in 10 CFR 54.4(a)(1).

A summary was prepared for each system that listed the identified system intended functions and the 10 CFR 54.4 criteria that caused the system to be within the scope of license renewal. Those systems for which no functions were identified as satisfying any of the three scoping criteria were classified as systems outside the scope of license renewal, and no further evaluation was performed. After identifying the system intended functions, the applicant established the system evaluation boundary, which identifies the portions of the system that are required to perform an intended function. Included in the evaluation boundary are the passive, long-lived components needed for the system to perform its intended functions. The components within the system evaluation boundary were reviewed according to the criteria of 10 CFR 54.4(a) used during evaluation of the system.

Electrical and Instrumentation and Control System Component Scoping. In LRA Section 2.1.4.2, the applicant described the scoping methodology for components in SR and NSR electrical and I&C systems. Specifically, the applicant selected the electrical and I&C components from the EMPAC list and evaluated them against the 10 CFR 54.4(a) criteria. The applicant reviewed NEI 95-10, and BFN documents such as plant drawings and EMPAC to determine the complete set of electrical commodities installed at BFN. These electrical commodities were included in the license renewal scope for evaluation using the spaces approach. The spaces approach identified the electrical and I&C commodity groups that are installed in the plant and the limiting environmental conditions for each group. The only exception to the spaces approach was in the SBO offsite power restoration methodology. The applicant used the conventional system evaluation methodology (i.e., mechanical system scoping) to identify the system intended functions and subsequent SCs within the scope of license renewal. As part of this review, the applicant reviewed the SSA calculation, UFSAR

descriptions, Maintenance Rule documents, CLB, and design-basis documents to determine the system's safety classification level, and to identify the system intended functions.

Structural Component Scoping. In LRA Section 2.1.4.3, the applicant described the scoping methodology for components within SR and NSR structures. Specifically, the applicant stated that the list of structures used for scoping was developed from the review of design drawings, design criteria document, and Maintenance Rule documentation, which include items such as free-standing buildings and structures, primary containment shell, tank foundations, manholes, tunnels, duct banks, and earthen structures. The applicant relied on the design criteria document for structures and the UFSAR to identify the safety classification of structures and structural components.

For review purposes, seismic Class I structures and structural components were considered SR. Structure functions were evaluated against the 10 CFR 54.4(a) criteria and structure intended functions were identified. The structure interfaces were examined and, in those instances where a failure of a structure could prevent a satisfactory accomplishment of any SR intended function or adversely impact other SR structures, that structure was identified and included within the scope of license renewal. The applicant reviewed detailed structural drawings for structures determined to be within the scope of license renewal to identify structural components. For structures within the scope of license renewal, all structural components required to support the intended functions were identified as within the scope of license renewal.

#### **2.1.2.2 Screening Methodology**

In LRA Section 2.1.5, "Screening Methodology," the applicant described the process of identifying the structures and components that are subject to an AMR. The applicant stated that, in accordance with 10 CFR 54.21(a)(1)(i), the screening process used the industry guidance contained in NEI-95-10, Revision 3, Appendix B, "Typical Structure, Component and Commodity Groupings and Active/Passive Determinations for the Integrated Plant Assessment," to identify SSCs from items within the scope of license renewal that require AMR. The identified SSCs were then sorted into groups that (1) perform an intended function, as described in 10 CFR 54.4, without moving parts or without a change in configuration or properties; and (2) those that are not subject to replacement based on a qualified life or specified time period. Components were then evaluated to determine which were long-lived. Components were considered long-lived unless specific plant documentation indicates the component is replaced at intervals of less than forty years.

##### **2.1.2.2.1 Mechanical Component Screening**

In LRA Section 2.1.5.1, the applicant described the component screening for mechanical systems as a continuation of the component scoping activity. The applicant evaluated each component within the scope of license renewal to determine if it has a passive function. If a component has a passive function that supports a system intended function, and if the component was determined to be long-lived, then the component was considered subject to an AMR. The applicant reviewed maintenance procedures, records, and vendor recommendations to determine if a component is long- or short-lived.

#### 2.1.2.2.2 Structural Component Screening

In LRA Section 2.1.5.3, the applicant described the methodology used to screen the structural components within the scope of license renewal. The screening methodology classified in-scope structural components as passive consistent with the guidance found in NEI 95-10, Appendix B. In-scope structural components such as elastomers, which are subject to replacement in specified intervals, were considered short-lived and were excluded from an AMR. The structural screening included certain structural components in electrical systems (e.g., cable trays) and mechanical systems (e.g., pipe supports).

#### 2.1.2.2.3 Electrical and Instrumentation and Control System Component Screening Methodology

In LRA Section 2.1.5.2, the applicant described the screening methodology for electrical and I&C components. The applicant had classified all electrical and I&C components within the scope of license renewal based on the spaces approach, with the exception of components in the SBO offsite power restoration flow path. Components were characterized as active or passive, based on NEI 95-10, Appendix B, guidance. Long-lived commodity groups were identified by using industry and BFN experience. The spaces approach identifies the electrical and I&C commodity groups that are installed in the plant and the limiting environmental conditions for each group. The spaces approach then determines if any area environment is more severe than the limiting environment for the commodity group. If the area environment is more severe than a commodity group's limit, and if a component in the commodity group is actually located in the area, an AMR is required for that commodity group.

### 2.1.3 Staff Evaluation

The staff evaluated the LRA scoping and screening methodology in accordance with the guidance contained in Section 2.1, "Scoping and Screening Methodology," of U.S. Nuclear Regulatory Commission Regulatory Guide (NUREG)-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (SRP-LR). The acceptance criteria for the scoping and screening methodology review are based on the following regulations:

- 10 CFR 54.4(a), as it relates to the identification of plant SSCs within the scope of the Rule.
- 10 CFR 54.4(b), as it relates to the identification of the intended functions of plant SSCs determined to be within the scope of the Rule.
- 10 CFR 54.21(a)(1) and (a)(2), as they relate to the methods used by the applicant to identify plant structures and components subject to an AMR.

As part of the review of the applicant's scoping and screening methodology, the staff reviewed the activities described in the following sections of the LRA using the guidance contained in the SRP-LR:

- Section 2.1, "Scoping and Screening Methodology," to verify that the applicant described a process for identifying SSCs that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(1), (a)(2), and (a)(3),

- Section 2.2, "Plant-Level Scoping Results"; Section 2.3, "Scoping and Screening Results: Mechanical Systems"; Section 2.4, "Scoping and Screening Results: Structures"; and Section 2.5, "Scoping and Screening Results: Electrical and Instrumentation and Control Systems," to verify that the applicant described a process for determining structural, mechanical, and electrical components that are subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1) and (a)(2).

In addition, the staff conducted a scoping and screening methodology audit at the Tennessee Valley Authority (TVA) corporate offices in Chattanooga, TN, from June 7 to 10, 2004. The focus of the audit was to ensure that the applicant had developed and implemented adequate guidance to conduct the scoping and screening of SSCs in accordance with the methodologies described in the application and the requirements of the Rule. The staff reviewed implementation procedures and engineering reports which describe the scoping and screening methodology implemented by the applicant. In addition, the staff conducted detailed discussions with the applicant on the implementation and control of the license renewal program and reviewed administrative control documentation and selected design documentation used by the applicant during the scoping and screening process. The staff further reviewed a sample of system scoping and screening results reports for the residual heat removal service water (RHRSW) system and the emergency equipment cooling water (EECW) system to ensure that the methodology outlined in the technical evaluations was appropriately implemented and the results were consistent with the CLB.

### **2.1.3.1 Scoping Methodology**

The scoping evaluations for the Browns Ferry Nuclear LRA were performed by the applicant's license renewal project personnel. The staff conducted detailed discussions with the applicant's license renewal project personnel and reviewed documentation pertinent to the scoping process. The staff assessed whether the scoping methodology outlined in the LRA and implementation procedures was appropriately implemented and whether the scoping results were consistent with CLB requirements.

#### **2.1.3.1.1 Implementation Procedures and Documentation Sources Used for Scoping and Screening**

The staff reviewed the applicant's scoping and screening implementation procedures to verify that the process used to identify structures and components subject to an AMR was consistent with the LRA and SRP-LR and that the applicant had appropriately implemented the procedural guidance. Additionally, the staff reviewed the scope of CLB documentation sources used to support the LRA development and the process used by the applicant to ensure that CLB commitments has been appropriately considered during the scoping and screening process.

Scoping and Screening Implementation Procedures. The staff reviewed the following TVA scoping and screening methodology implementation procedures and engineering documents:

0-TI-346	Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting
0-TI-455	Mechanical Technical Evaluations For License Renewal, Revision 2

0-TI-456	Electrical Technical Evaluations For License Renewal
0-TI-457	Civil Technical Evaluations For License Renewal
0-TI-458	License Renewal Time Limited Aging Analyses, Revision 1
NEDP-21	Technical Evaluations for License Renewal, Revision 2
NEDP-4	Q-list and UNID Control, Revision 7
NEDP-5	Design Document Reviews
SPP-3.1	Corrective Action Program, Revision 6
SPP-9.6	Master Equipment List, (MEL) Revision 6

In reviewing these procedures, the staff focused on the consistency of the detailed procedural guidance with information in the LRA and the various staff positions documented in the SRP-LR and interim staff guidance documents. The staff found that the scoping and screening methodology instructions were generally consistent with LRA Section 2.1 and were of sufficient detail to provide the applicant with concise guidance on the scoping and screening implementation process to be followed during the LRA activities.

In addition to the implementing procedures, the staff reviewed supplemental design information including design-basis documents, system drawings, and selected licensing documentation, that the applicant relied on during the scoping and screening phases of the review. The staff found these design documentation sources to be useful for ensuring that the initial scope of SSCs identified by the applicant was consistent with the plant's CLB.

Sources of Current Licensing Basis Information. The staff reviewed the scope and depth of the applicant's CLB review to verify that the methodology was sufficiently comprehensive to identify SSCs within the scope of license renewal and SCs requiring an AMR. As defined in 10 CFR 54.3(a), the CLB is the set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with, and operation within, applicable NRC requirements and the plant-specific design basis that are docketed and in effect. The CLB includes certain NRC regulations, orders, license conditions, exemptions, technical specifications, design-basis information documented in the most recent UFSAR, and licensee commitments remaining in effect from docketed licensing correspondence such as applicant responses to NRC bulletins, generic letters (GLs), and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports. The applicant identified differences between the CLB for Unit 1 and the CLB for Units 2 and 3, and documented them in LRA Appendix F.

The staff determined that LRA Section 2.1.3 provides a description of the CLB and related documents used during the scoping and screening process that is consistent with the guidance contained in the SRP-LR and NEI 95-10. Specifically, the applicant provided a comprehensive listing of documents that could be used to support scoping and screening evaluations. The applicant noted that system descriptions and system intended functions had been identified based on the review of the applicable sections of the UFSAR, Appendix B determinations, Maintenance Rule scoping document, and design and licensing basis documents.

Conclusion. Based on a review of information provided in LRA Section 2.1, a review of the applicant's detailed scoping and screening implementation procedures, and the results from the scoping and screening audit, the staff concluded that the applicant's scoping and screening methodology had considered a scope of CLB information generally consistent with the guidance contained in the SRP-LR and NEI 95-10.

Quality Assurance Controls Applied to LRA Development. The staff reviewed the quality assurance controls used by the applicant to verify that they provided reasonable confidence that the LRA scoping and screening methodologies had been adequately implemented. The applicant chose not to credit the existing 10 CFR 50, Appendix B quality assurance program for the development of the LRA. However, the applicant controlled the LRA development activities as follows:

- Written procedures and guidelines governed implementation of the scoping and screening methodology.
- All final in-scope and screening information was developed by a lead technical staff member and independently reviewed by an additional technical staff member prior to being reviewed and approved by the program manager.
- The applicant developed a formal database for documenting license renewal information identified during in-scope and screening evaluations. This database was controlled in accordance with written instructions, and access to it was strictly controlled.
- The LRA was reviewed and approved by an independent expert committee comprised of experienced members of the TVA corporate engineering staff and BFN personnel.
- The applicant conducted two program peer reviews and one self-assessment of LRA activities to validate the implementation process and the technical accuracy of the application.
- The applicant instituted a training program, which required all participants in LRA activities to be certified to perform LRA activities and to attend training on the use of procedures, guidance documents, computer programs, and drawings.

Conclusion. The staff concluded that these quality assurance activities, which exceeded current regulatory requirements, provided additional assurance that LRA development activities were performed consistently with the LRA descriptions.

Training for License Renewal Project Personnel. The staff reviewed the applicant's implemented training process to ensure the guidelines and methodology for the scoping and screening activities would be performed in a consistent and appropriate manner. The applicant's LRA staff consisted of several engineers and contractors who had gained previous license renewal experience working on the Edwin I. Hatch LRA. The purpose of the training was to provide a framework for ensuring that the staff assigned to the technical portion of the LRA acquired a fundamental level of knowledge of the license renewal process and regulatory requirements. BFN used the Nuclear Engineering Design Procedure (NEDP)-7, Engineering Support Personnel Training, Revision 12, dated January 29, 2004, to impart training to all personnel involved in the LRA activities. Other documents used in the training include NEDP-7 Qualifications Guides (QGs), Task-Specific QGs, License Renewal Program, NEDP-21, Technical Evaluation for License Renewal, the *Code of Federal Regulations*, and NEI 95-10,

## Industry Guidelines for Implementing the Requirements of 10 CFR Part 54 - The License Renewal Rule.

The staff reviewed the completed qualification and training records of several of the applicant's license renewal staff, including both experienced and non-experienced members, who performed scoping and screening activities. The staff did not identify any adverse findings.

Additionally, based on discussions with the applicant's license renewal personnel during the audit, the staff verified that the applicant's license renewal staff were knowledgeable concerning the license renewal process requirements and the specific technical issues within their areas of responsibility. The staff found that the applicant's license renewal training records were considered quality-related records and that these records were accurate, comprehensive, and complete.

Conclusion. The results from the scoping and screening audit indicate that the applicant considered the information in the CLB for Units 1, 2, and 3 in developing the scoping and screening methodology. The CLB documentation review methodology was capable of identifying the intended functions of the SSCs in a manner consistent with the requirements of 10 CFR 54.4 and 10 CFR 54.21. In addition, the applicant applied appropriate quality controls during the development of the application and adequately trained the applicable personnel. The staff concluded that the applicant had considered all relevant information during the preparation of the scoping and screening methodologies.

### 2.1.3.1.2 Application of the Scoping Criteria in 10 CFR 54.4(a)

The staff evaluated the application of the scoping criteria for the methodology for scoping SR- and NSR-related SSCs and SSCs relied upon to demonstrate compliance with regulated events pursuant to 10 CFR 54.4(a). The results of the staff's evaluation are described below.

Application of the Scoping Criteria in 10 CFR 54.4(a)(1). Pursuant to 10 CFR 54.4(a)(1), the applicant must consider all SR SSCs that are relied upon to remain functional during and following DBEs to ensure the following functions: (1) maintain the integrity of the reactor coolant pressure boundary, (2) maintain the ability to shut down the reactor and maintain it in a safe shutdown condition, or (3) maintain the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to those referred to in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2) or 10 CFR 100.11.

During the scoping and screening methodology audit, the staff questioned how non-accident DBEs, particularly DBEs that may not be described in the UFSAR, were considered during scoping. The applicant responded by identifying the DBEs applicable to BFN, including external hazards such as fire, earthquakes, flooding, wind and missiles, and high-energy line breaks. Additional DBEs were evaluated in the SSA calculation that was used by the applicant as a primary source for the purposes of identifying SSCs within the scope of license renewal. The SSA calculation was reviewed by the staff and discussed with the applicant. The staff found that the report contained a concise and detailed evaluation of approximately 35 events, and included appropriate CLB documentation references to support the review. The staff concluded that the applicant considered a scope of DBEs that was consistent with the guidance contained in the SRP-LR.

In addition, the staff evaluated the guidance documents governing the applicant's evaluation of SR SSCs: specifically, BFN standard department procedures; NEDP-5, "Design Document Reviews," Revision 2; NEDP-21, "Technical Evaluations for License Renewal," Revision 2; and license renewal instruction series 0-TI-455 through 458. Guidance was established for the preparation, review, verification, and approval of the scoping evaluations to assure the adequacy of the results of the scoping process. During the scoping and screening audit the staff reviewed the guidance and discussed the scoping approach with the applicant. Specifically, the staff reviewed a sample of the license renewal scoping results for the residual heat removal (RHR) system to provide additional assurance that the applicant adequately implemented its SR scoping methodology. The system scoping sheet identified the RHR system as SR with additional NSR systems supporting its operation. The evaluation identified the RHR system as meeting several of the 10 CFR 54.4(a)(3) criteria including: (1) EQ, (2) fire protection, and (3) SBO. All the system safety descriptions were listed, and the licensing basis calculations supporting those determinations were appropriately referenced. The report identified the cognizant license renewal staff members who prepared and verified the results. The applicant documented the information on a scoping results form. The applicant created a license boundary drawing in which every component in the system was identified by its unique component identifier (UNID) number, the description of the component, whether it was SR or NSR, whether it supported any of the regulated events, and the commodity material group to which it belonged (valve or pump etc.). The staff determined that the applicant identified and used pertinent engineering and licensing information to support the scoping determinations for the items sampled, and found the preparation, review, and approval of the scoping results to be effective for the development and evaluation of SR functions and subsequent identification of SSCs within the scope of license renewal.

The applicant reviewed the license renewal drawings in conjunction with physical drawings and component listings from EMPAC to determine the in-scope components that met the SR scoping criterion. All components identified as SR using the SR classification field in the EMPAC were considered for inclusion within the scope of the license renewal project. The applicant noted that the EMPAC safety-classification field was prepared many years ago using a definition for SR that was not necessarily the same as the definition of SR as described in the Rule. The staff reviewed the safety classification criteria used to determine the EMPAC safety classification to verify consistency with the 10 CFR 54.4(a)(1) criteria. The staff determined that the nuclear SR definition used by the applicant in its safety classification program did not include all the exposure limitations referenced in 10 CFR 54(a)(1)(iii). Specifically, procedures BFN-50-739, "Classification of Structures, Systems, and Components, Revision 3," and NEDP-4, "Q-list and UNID Control, Revision 7," did not include a reference to the offsite exposure limitations contained in 10 CFR 50.67(b)(2) for use of an alternate source term (AST).

Based on the above, the staff identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's request for additional information (RAI) as discussed below.

In RAI 2.1-1, dated July 30, 2004, the staff requested the applicant to provide additional information to describe the SR classification definitions that were used in developing the list of SSCs for the license renewal scoping and screening process, and describe how the offsite exposure limitations were factored into the LRA.

In its response, by letter dated September 3, 2004, the applicant stated:

Consistent with 10 CFR 54.4(a)(1)(iii), BFN utilized a definition of safety-related that incorporated potential offsite exposures as follows: "The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 10 CFR 50.34(a)(1), 10 CFR 50.67(b)(2), or 10 CFR 100.11, as applicable." The applicable regulation for BFN is 10 CFR 100.11. 10 CFR 50.34 applies to applications for a construction permit and as such is not applicable to BFN. 10 CFR 50.67(b)(2) is applicable to plants revising their current accident source term to Alternative Source Term (AST). TVA has submitted a request for an amendment to the BFN Units 1, 2, and 3 facility operating licenses supporting a full scope application of the AST methodology. The application of AST is not approved by NRC hence, 10 CFR 50.67(b)(2) is not applicable to BFN. The BFN safety-related equipment classification and the SSCs included in the scope of license renewal continue to be based on potential offsite exposures contained in 10 CFR 100. Based on a review of TVA's AST submittal it is expected no new systems or component types will be added within the License Renewal scope that are not already identified in the application.

On September 27, 2004, the staff approved the applicant's license amendment request regarding AST per 10 CFR 50.67(b)(2) for offsite dose exposure as the CLB for BFN. Since the definition of SR components as applied to the scoping of components in the LRA can be either 10 CFR 50.67(b)(2) or 10 CFR 100.11, as applicable, and the AST submittal did not add new components within the LRA scope, it does not impact the SR definition. Hence the staff concluded that, consistent with 10 CFR 54.4(a)(ii), BFN utilized a definition of SR that included the capability to shut down the reactor and maintain it in a safe shutdown condition. The staff determined that the applicant's response is acceptable. The staff's concern described in RAI 2.1-1 is resolved.

Conclusion. The staff reviewed a sample of the license renewal database 10 CFR 54.4(a)(1) scoping results and discussed the methodology and results with the applicant's license renewal project personnel. The staff verified that the applicant had identified and used pertinent engineering and the CLB in order to determine the SSCs required to be within the scope of license renewal in accordance with the 10 CFR 54.4(a)(1) criteria. On the basis of a review of the applicant's methodology and evaluation of a sampling of scoping results and responses to the staff's RAI, the staff concluded that the applicant's SR scoping methodology provided reasonable assurance that SSCs meeting the scoping criteria of 10 CFR 54.4(a)(1) were included within the scope of license renewal.

Application of the Scoping Criteria in 10 CFR 54.4(a)(2). Section 54(a)(2) of 10 CFR requires, in part, that the applicant consider all NSR SSCs whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs 10 CFR 54(a)(1)(i), 10 CFR 54(a)(1)(ii), or 10 CFR 54(a)(1)(iii) to be within the scope of the license renewal.

In addition, by letters dated December 3, 2001, and March 15, 2002, the NRC issued a staff position to the NEI, which described areas for applicants to consider and options it expects applicants to use to determine which SSCs meet the 10 CFR 54.4(a)(2) criterion (i.e., all NSR SSCs whose failure could prevent satisfactory accomplishment of any SR functions identified in paragraphs 10 CFR 54.4(a)(1)(i)-(iii)). The December 3, 2001, letter provided specific examples of operating experience that identified pipe failure events (summarized in Information Notice

(IN) 2001-09, "Main Feedwater System Degradation in Safety-Related ASME Code Class 2 Piping Inside the Containment of a Pressurized Water Reactor") and the approaches the staff considers acceptable to determine which piping systems should be included within the scope of license renewal based on the 10 CFR 54.4(a)(2) criterion. The March 15, 2002, letter, further described the staff's expectations for the evaluation of non-piping SSCs to determine which additional NSR SSCs are within the scope of license renewal. The position states that applicants should not consider hypothetical failures, but, instead, should base their evaluation on the plant's CLB, engineering judgment and analyses, and relevant operating experience. The paper further describes operating experience as all documented plant-specific and industry-wide experience that can be used to determine the plausibility of a failure. Documentation would include generic communications and event reports, plant-specific condition reports, industry reports such as significant operating experience reports (SOERs), and engineering evaluations.

As stated in the LRA, the applicant had included in the scope of license renewal NSR SSCs whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs 10 CFR 54.4(a)(1)(i)-(iii). The applicant identified SSCs satisfying criterion 10 CFR 54.4(a)(2) based on review of applicable CLB and engineering design bases and design documents, plant-specific and industry operating experience, and industry guidance documents.

The applicant documented the review of scoping activities in support of 10 CFR 54.4(a)(2) in an engineering report titled "10 CFR 54.4(a)(2) Scoping Methodology." The applicant discussed the scoping methodology as it related to the NSR criteria in accordance with 10 CFR 54.4(a)(2). With respect to the NSR criteria, the applicant stated that a review had been performed to identify the NSR SSCs whose failure could prevent satisfactory accomplishment of the SR intended functions identified in 10 CFR 54.4(a)(1).

As stated in the LRA, the applicant identified NSR SSCs whose failure could prevent satisfactory accomplishment of a safety function. The impacts of NSR system, structure, and component (SSC) failures were considered as either functional or spatial. In a functional failure, the failure of an SSC to perform its normal function impacts a safety function. In a spatial failure, a safety function is impacted by the loss of structural or mechanical integrity of an SSC in physical proximity to an SR component.

Functional Failures of Nonsafety-Related SSCs. In general SSCs required to perform a function in support of SR functions were classified as SR and included in the scope of license renewal per 10 CFR 54.4(a)(1). For the exceptions where NSR SSCs are required to remain functional in support of an SR function (and were not classified as SR), the supporting SSCs are included within the scope of license renewal pursuant to 10 CFR 54.4(a)(2).

Overhead-Handling Systems. Overhead-handling systems located in structures that contain SR SSCs were considered in scope if they had the ability to drop a load resulting in damage to an SSC that prevents satisfactory accomplishment of an SR intended function.

Nonsafety-related SSCs Directly Attached to Safety-Related SSCs. The applicant used a spaces approach and included all NSR liquid-filled piping and the corresponding supports that were located in buildings or structures that contain SR equipment within the scope of license renewal in accordance with 10 CFR 54.4(a)(2), with exceptions as discussed below. The

applicant used plant drawings, such as flow diagrams, physical drawings, and isometric drawings to determine which systems, or portions of systems, were located in each building or structure. The applicant indicated that, by including within the scope of license renewal all NSR piping and corresponding supports in buildings or structures that contain SR equipment, the need to identify the piping up to the first seismic anchor was eliminated and that at the point where an NSR system leaves the building or structure that contains the SR SSCs and enters a building or structure that contains no SR SSCs, the NSR piping and supports are no longer within the scope of license renewal.

The staff discussed the spaces approach with the applicant and determined that, since all NSR piping and supports in the SR structure were considered within the scope of license renewal in accordance with 10 CFR 54.4(a)(2), the applicant had not identified any "equivalent anchors" as a scoping boundary, but, instead, had marked scoping boundaries at the structure wall. The staff reviewed license renewal boundary drawing 1-47E801, which showed the four main steam lines in red (denoting within scope) in the reactor building. Where the main steam line piping exited the reactor building and entered the turbine building, the color changed from red to black, denoting the change from within scope to outside the scope of license renewal.

The staff's review of LRA Section 2.1 identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

In RAI 2.1-2A, dated July 30, 2004, the staff requested the applicant provide the following:

1. A description of the criteria used to determine that the integrity of the in-scope piping functions will be preserved if an age-related degradation failure occurs in the attached NSR piping.
2. A description of how it was determined that the SR piping in the reactor building is adequately supported so that it will remain functional if an age-related degradation occurs in the attached NSR piping in the turbine building.
3. A description of how the methodology ensured that the NSR piping up to first equivalent anchor point was included within the scope of license renewal.

The applicant responded to RAI 2.1-2A(1) and (2) by letters dated September 3, 2004, and October 18, 2004. In those responses, the applicant described the evaluation of SR and NSR portions of the main steam piping system. Specifically, the applicant stated, in part, that the seismic Class I portions of the four main steam lines have anchors isolating them from the seismic Class II piping. The seismic Class I/II interface is at the anchor. The piping up to the anchor is designed to seismic Class I requirements. The anchor locations are inside the reactor building, outboard of the isolation valves. The piping up to the anchor, and the anchor, is included within the scope of license renewal per 10 CFR 54.4(a)(1).

The NSR piping segments extending from the anchors to the reactor building/turbine building interface are qualified to seismic Class II pressure retention requirements to support secondary containment. Since secondary containment is an SR function, these piping segments are in the scope of license renewal and are shown in red on the license renewal drawing. This is consistent with BFN's scoping methodology document which states that some NSR SSCs have been determined to perform SR intended functions (e.g., secondary containment, or main

steam alternate leak path). As such, the applicant identified all piping supports, and other components inside secondary containment that are required to maintain the structural integrity of the secondary containment and verified that these SSCs were brought into scope. Additionally, the applicant stated that it would identify any additional piping, supports, and other components outside secondary containment that are required to maintain the structural integrity of the secondary containment prior to the period of extended operation.

After review of the information provided by the applicant regarding its evaluation, the staff held a teleconference with the applicant on May 3, 2005, and informed the applicant that any additional SSCs outside secondary containment necessary to maintain the structural integrity of the secondary containment must be identified and evaluated for aging effects as part of the current license renewal activities. As a result, the applicant performed a supplemental review of the SSCs associated with the secondary containment piping to identify those that are necessary to maintain the structural integrity of the secondary containment. This supplemental review was provided to the staff in a letter from the applicant, dated May 31, 2005. Specifically, the applicant described its supplemental review process, which included a review of plant drawings and piping system qualification documentation and performance of plant system walkdowns to identify the NSR piping, supports, and other components that are within the scope of license renewal for 10 CFR 54.4(a)(2) for secondary containment qualification. The results of this supplemental review identified several system boundary changes and identification of several new component types, materials, or environments that affected the AMR results. Details of the scoping results that expanded the boundaries of these systems and revisions to the AMR results are discussed in SER Sections 2.3, 2.4, and 3.5, respectively.

Based on the applicant's supplemental evaluation of SSCs associated with the secondary containment, which included a review of plant system drawing, piping and support qualification documentation, and extensive plant system walkdowns, the staff determined that the applicant had performed an adequate analysis to identify certain additional piping, components, and structures to be included within the scope of license renewal. The staff concluded that the analysis and inclusion of additional SSC's within the scope of license renewal adequately addressed RAI 2.1-2A(1) and (2). Therefore, the staff's concerns described in the RAI are resolved.

By letters dated September 3, 2004, October 18, 2004, January 31, 2005, and February 28, 2005, the applicant addressed RAI 2.1-2A(3) as discussed below.

The applicant indicated that during the restart of Units 2 and 3, and during the current restart process for Unit 1, the seismic Class I qualification documentation had been updated to ensure that the analyzed configuration reflected the as-built configuration. This documentation implements the CLB and provides the information necessary to determine the NSR piping and components that are necessary to maintain qualification of the connected SR piping and components. To ensure the license renewal boundaries are consistent with the CLB requirements, the applicant performed a review of the seismic Class I qualification documentation to identify the NSR piping, supports/equivalent anchors, and other components that are within the scope of license renewal for 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

This review included the verification of each seismic Class I boundary identified in the CLB. The seismic Class I boundaries could typically be included in one of the following categories:

- Base-Mounted Equipment (pump, heat exchanger, tank, etc.) – a rugged component that is designed to provide support for connected piping and impose no loads on the piping. The review assures that when base-mounted equipment implements a seismic Class I boundary, the piping from the boundary to the equipment, and the equipment itself, are included within the scope of license renewal.
- Pipe Anchor – a special pipe support, which resists all six degrees of freedom, that has been designed and installed on the piping. The review assures that when a pipe anchor implements a seismic Class I boundary, the piping from the boundary to the pipe anchor, and the pipe anchor itself, are included within the scope of license renewal.
- Embedded Piping Segment – where piping is structurally attached (usually welded) to piping that is embedded in a concrete floor or wall and acts as an anchor. The review assures that when an embedment implements a seismic Class I boundary, the piping from the boundary to the embedment, and the embedment itself, are included within the scope of license renewal.
- Large Run Line – when a branch line moment of inertia is significantly smaller than a run line's moment of inertia, the branch line can be decoupled from the run line. The run line is then considered as an equivalent anchor. The review assures that in a case in which a large run line forms a seismic Class I boundary, the large run line is included within the scope of license renewal.
- Piping Free End – piping qualified up to an end that has no structural connection. The review assures that when a seismic Class I boundary is formed by a piping free end, all of the piping and supports from the boundary to piping free end(s) are included within the scope of license renewal.
- Flexible Connection – where a pipe stress analysis terminates at a flexible connection that is considered as a free end in that analysis. The review assures that when a flexible connection forms a seismic Class I boundary, the piping and supports from the boundary to the flexible connection are included within the scope of license renewal.
- Overlap Regions – where a series of single or multidirectional pipe supports have been installed to isolate one region of piping from another. The review assures that when an overlap region forms a seismic Class I boundary all of the piping and supports in the overlap region are included within the scope of license renewal.

The applicant indicated that the results of the review brought new portions of piping, components of existing systems, and two additional structures within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2).

The staff determined that the applicant had performed an analysis that defined several types of seismic Class I boundaries and had appropriately used this information to identify certain additional piping, components, and structures to be included within the scope of license renewal. The staff concluded that the analysis and inclusion of additional SCs within the scope of license renewal adequately addressed RAI 2.1-2A(3). Therefore, the staff's concern described in RAI 2.1-2A(3) is resolved.

Nonsafety-Related SSCs in Proximity of Safety-Related SSCs. The applicant used a spaces approach and included all NSR liquid-filled piping and the corresponding supports that are located in buildings or structures that contain SR equipment within scope in accordance with

10 CFR 54.4(a)(2), with exceptions as discussed below. The applicant used plant drawings, such as flow diagrams, physical drawings, and isometric drawings to determine which systems, or portions of systems, are located in each building or structure.

NSR high-energy piping located in buildings or structures that contain SR equipment was included within the scope of license renewal per 10 CFR 54.4(a)(2). The applicant had taken an exception to this approach by not including within the scope of license renewal the NSR pipe located in the SR-classified turbine building, although twelve SR main steam tunnel temperature switches are located in the main steam tunnel portion of the turbine building. In addition to the main steam lines, the main steam tunnel houses other NSR piping and components. The staff was unable to determine if the applicant demonstrated that the twelve temperature switches installed in the steam tunnel portion of the turbine building are adequately protected from age-related degradation of NSR SSCs.

In RAI 2.1-2B, dated July 30, 2004, the staff requested the applicant to address whether the 12 temperature switches installed in the main steam tunnel portion of the turbine building are adequately protected from wetting or spraying from the failure of NSR SSC components due to age-related degradation.

In its responses, by letters dated September 3, 2004, and October 18, 2004, the applicant addressed RAI 2.1-2B.

The applicant indicated that a design change notice (DCN) will be developed that will qualify the circuits for wetting and spray from a moderate/low-energy line break. The DCN will replace the temperature switch connectors and will also seal conduits as required to ensure circuit integrity and to mitigate the consequences of a moderate/low-energy line break. The applicant indicated that identification of moderate/low-energy, liquid-filled piping systems located in the vicinity of the temperature switches was not necessary since the switches will be qualified for the environment that would result from a moderate/low-energy line break. The applicant indicated that the DCN will be implemented prior to the period of extended operation.

The staff reviewed the response to RAI 2.1-2B and determined that the applicant had indicated that a DCN would be issued to modify the temperature switches located within the main steam tunnel such that they would be qualified to perform in an environment resulting from a moderate/low-energy line break. Therefore, the staff concern described in RAI 2.1-2B is resolved.

NSR moderate/low-energy piping located in buildings or structures that contain SR equipment was generally included within the scope of license renewal in accordance with 10 CFR 54.4(a)(2). The exceptions to inclusion within scope were identified in the LRA as the turbine building (discussed above), intake pumping station, and the RHRSW tunnel.

In RAI 2.1-2C, dated July 30, 2004, the staff stated that in engineering report "10CFR54.4(a)(2) Scoping Methodology," the applicant discussed the basis for exclusion of moderate/low energy piping located within the intake pumping station and RHRSW tunnel. The report stated that active SR components located within the intake pumping station were environmentally qualified and were normally exposed to outside weather conditions. In addition, the water from the NSR moderate/low energy pipe in the intake pumping station would not adversely affect the passive SR components (pipes or manual valves) since degradation would occur gradually over a

period of time and system leakage would be detected prior to such degradation by plant personnel during activities such as operator rounds, routine radiation protection surveys or system engineer walkdowns. The same basis was applied to the potential effect of fluid from NSR SSCs on SR SSCs within the RHRSW tunnel (which only contain passive SR SSCs). Therefore, the staff requested that the applicant provide the additional information concerning the basis for the conclusion that failure of moderate/low energy fluid-filled NSR SSCs in the proximity of passive SR SSCs will not adversely affect the SR SSCs.

By letters dated September 3, 2004, and October 18, 2004, the applicant addressed RAI 2.1-2C, as discussed below.

The applicant reviewed the NSR fluid piping systems contained in the RHRSW tunnel and determined that all piping systems are within the scope of license renewal, with the exception of the 24-inch raw cooling water discharge piping, which was subsequently included within the scope of license renewal. The applicant indicated that exposure duration was not used in the scoping process.

In addition, the applicant reviewed the effect of water spray from NSR systems at the intake pumping station structure. The applicant determined that the SR equipment located within the intake pumping structure was designed for a normal operating environment of outside air, which includes precipitation and operation in a wetted environment. The applicant revised its scoping methodology to address components located in the lower compartments of the intake pumping station, which are subject to submergence during the probable maximum flood. The applicant determined that all SR passive electrical components installed at the intake pumping station are located above probable maximum flood level and are designed to either be protected from the effects of a wetted environment or designed to perform their function in a wetted environment. The applicant indicated that exposure duration was not used in the scoping process.

The staff reviewed the response to RAI 2.1-2C and determined that the applicant had not taken credit for exposure duration to exclude any NSR piping located within the RHRSW tunnel from scoping consideration. The applicant had included all applicable NSR piping within the scope of license renewal for the RHRSW tunnel. In addition, the applicant had determined that SR components in the intake pumping station, that are located above the probable maximum flood level are either protected from the effects of a wetted environment or designed to perform their function in a wetted environment. The staff concluded that this adequately resolved RAI 2.1-2C.

Conclusion. On the basis of the additional information supplied by the applicant, including determining that certain additional SSCs that would be placed within the scope of license renewal based on analysis and additional review, determining that certain SSCs were qualified for the environment, identifying the basis for the definition and use of the first equivalent anchor, and reviewing the results of NRC inspection and audit activities, the staff concluded that the applicant had supplied sufficient information to demonstrate that all SSCs that meet the 10 CFR 54.4(a)(2) scoping requirements have been identified as being within the scope of license renewal.

Application of the Scoping Criteria in 10 CFR 54.4(a)(3). Section 54(a)(3) of 10 CFR requires, in part, that the applicant consider all SSCs relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with NRC regulations for fire protection

(10 CFR 50.48), EQ (10 CFR 50.49), ATWS (10 CFR 50.62), and SBO (10 CFR 50.63) to be within the scope of license renewal.

The applicant performed the initial scoping for regulated events by evaluating CLB information relevant to each regulated event to identify if the structure or system met the scoping criteria of 10 CFR 54.4(a)(3). For these events, the applicant developed an engineering report describing the relevant Rule requirements. A functional description of the implementation includes the process to identify the scoping boundaries associated with the systems credited, the intended functions applicable to the requirement, information on how to record the results of the evaluation in the license renewal database and appropriate MEL, a list of CLB information sources used for the analysis, and a list of systems and components determined to be within scope for the given regulated event.

- Fire Protection. The applicant provided a description of the scoping of SSCs required to demonstrate compliance with the fire protection requirements in 10 CFR 50.48. The applicant stated that the fire protection report, EMPAC, and the CLB had been reviewed to ensure that SSCs required to perform the necessary safe shutdown functions and to minimize the risk of radioactive releases to the environment during and following fires are included within the scope of license renewal. In addition, the applicant stated that it considered the NRC's Interim Staff Guidance (ISG) related to scoping fire protection equipment, ISG-07, to determine if a system performs a function that demonstrates compliance with NRC's regulations. Specifically, the applicant verified that the EMPAC contains a designated field identifying components that are part of the fire protection program consistent with the CLB. The staff reviewed the process used by the applicant to identify those components and verified, through review of a selection of scoping results, that the EMPAC information was adequately incorporated into the license renewal evaluation.
- Environmental Qualification. The applicant stated that BFN maintains documents containing detailed information related to environmental qualification of components at BFN. Additionally, EMPAC provides a list of components that are subject to an EQ program. The applicant reviewed these documents to prepare the list of in-scope items for the LRA. Specifically, EMPAC contains a designated field identifying components that are part of the EQ program. The staff reviewed the process used by the applicant to identify those components and verified, through review of a selection of scoping results, that EMPAC information was adequately incorporated into the license renewal evaluation.
- Anticipated Transient Without Scram. The applicant reviewed UFSAR Section 7.19 and used the quality-related classification field in EMPAC to identify components of the ATWS mitigation system required by 10 CFR 50.62. EMPAC is a controlled plant component database containing integrated design and maintenance record management information. The plant component database lists plant components at the level of detail for which discrete maintenance or modification activities are typically performed. Specifically, EMPAC contains a designated field identifying components that are credited for ATWS mitigation. The staff reviewed the process used by the applicant to identify those components and verified, through review of a selection of scoping results, that the EMPAC information had been adequately incorporated into the license renewal evaluation.

- Station Blackout. In an NRC letter dated April 1, 2002, the staff provided guidance on the scoping of equipment relied on to meet the requirements of the SBO rule, 10 CFR 50.63. In this letter, the staff noted that, consistent with the requirements specified in 10 CFR 54.4(a)(3) and 10 CFR 50.63(a)(1), the plant system portion of the offsite power system that is used to connect the plant to the offsite power source should be included within the scope of the Rule.

In LRA Section 2.1.8.2, the applicant stated that, based on the guidance in the April 1, 2002, letter for SBO recovery, an evaluation was performed to determine, and bring into the scope of license renewal, components credited for recovery of the offsite power system. For each of the systems credited for SBO recovery, the applicant used, as a minimum, information from the SBO calculations and Emergency Operating Procedures and Technical Specification Bases 3.8.1, to determine the appropriate NSR portions of the in-plant electrical system that would be used to connect the offsite power system to the SR portions of the plant electrical system. The applicant performed calculations to summarize the results of a detailed review of SBO CLB documentation. The calculations provided lists of systems with their credited functions and a listing of major components. The applicant did not use the spaces approach to evaluate all plant electrical and I&C components in the SBO offsite power restoration flow path. The applicant provided license renewal drawings that identified the additional components in the offsite power restoration flow paths from 500 kilovolt (kV) and 161 kV switchyards to the plant SR shutdown buses using plant procedures for the restoration of offsite power.

Additionally, an AMR was performed for all long-lived passive structures and components within these systems. A scoping effort identified structures and components of the offsite power system for each plant required to restore power from the onsite switchyard down to the SR busses in the plant. The applicant also stated that the plant offsite power system and these structures and components were classified as satisfying 10 CFR 54.4(a)(3) criteria and were included within the scope of license renewal. The staff determined that the applicant's approach to scoping SSCs relied on to demonstrate compliance with the SBO rule (10 CFR 50.63) was consistent with the staff's April 1, 2002, interim guidance.

Conclusion. The staff reviewed a sample of the license renewal database 10 CFR 54.4(a)(3) scoping results and discussed the methodology and results with the applicant's license renewal project personnel. The staff verified that the applicant had identified and used pertinent engineering and licensing information to identify SSCs to be within the required scope in accordance with the 10 CFR 54.4(a)(3) criteria. On the basis of this sample review, discussions with the applicant, and review of the applicant's scoping process, the staff determined that the applicant's methodology for identifying systems and structures meeting the scoping criteria of 10 CFR 54.4(a)(3) was adequate.

#### 2.1.3.1.3 System Level Scoping of Structures and Components

The applicant started the system-level scoping of structures and components with the review of the SSA calculation, UFSAR descriptions, Maintenance Rule documents, CLB, and design-basis documents to determine the system safety classification level functions and to identify the system intended functions. The SSA provided the system designation and the system function. The relevant flow drawings were retrieved for the system and description, and their safety classifications were determined. The components were identified and their functions were mapped. The applicant consulted the UFSAR to see if any additional functions were listed

therein, because the applicant created the SSA during the restart of Units 2 and 3, listing all the possible system functions.

At the system level, the scoping methodology used for electrical and I&C systems was identical to the mechanical system-level scoping. The SSA calculation, UFSAR descriptions, Maintenance Rule documents, and other design-basis documents were reviewed to determine an electrical system's safety classification and to identify the electrical system's intended functions. System-level functions were evaluated against the criteria of 10 CFR 54.4(a). This information was included in the license renewal database for inclusion in the LRA.

The applicant entered the information on the "System Scoping Results" data sheet for the specific system. The staff reviewed the scoping results for the RHR system and observed that the data sheet contained detailed information that identified each component and its parent system, component type, the scoping criteria that it was required to meet, and its associated AMR information.

#### 2.1.3.1.4 Component Level Scoping

The applicant reviewed license renewal boundary drawings in conjunction with physical layout drawings and component listings from EMPAC to determine the components within the scope of license renewal. Any component that was needed to fulfill any system intended function or determined to be an NSR component that could prevent satisfactory accomplishment of an SR function was considered to be within the scope of license renewal. The applicant evaluated the components either individually or in groups of like components and functions to ensure that all components were properly addressed. Electrical and I&C components of in-scope mechanical systems were classified as electrical and I&C commodities. Structural components of in-scope mechanical systems were classified as structural commodities. Structural commodities, such as cable trays and their supports, were classified as plant civil system commodities. Pressure boundary components of electrical penetrations were classified as civil commodities. Structural components of in-scope structures that are required to support the intended functions were generally evaluated as generic structural commodities, and not individual components.

Mechanical Component Scoping. The staff reviewed 0-TI-455, "Mechanical Technical Evaluation for License Renewal," Revision 2, dated May 28, 2004. The applicant provided a technical description and overview of the process in Section 4.1, Mechanical Scoping and Screening, of 0-TI-455. Specifically, the applicant stated that systems and components are determined to be within the scope of license renewal if they have been evaluated to meet any of the scoping criteria.

The staff verified that mechanical system evaluation boundaries were established for each system within the scope of license renewal. These boundaries were determined by mapping the pressure boundary associated with system-level license renewal intended functions onto the system flow and control drawings. Mechanical component types were loaded into a scoping and screening database and further review was performed to ensure that all component types were identified. A preparer and an independent reviewer performed a comprehensive evaluation of the boundary drawings to ensure the completeness and accuracy of the review results. Following identification of all system component types, the applicant used the license renewal boundary as an aid to evaluate each component against the scoping criteria of 10 CFR 54.4(a).

System components meeting the criteria of 10 CFR 54.4(a) were classified as within the scope of license renewal.

The staff conducted detailed discussions with the applicant's license renewal project personnel and reviewed documentation pertinent to the scoping process. The staff assessed whether the applicant had appropriately applied the scoping methodology outlined in the LRA and implementation procedures and whether the scoping results were consistent with CLB requirements.

The staff reviewed the process of scoping for the RHRSW and ECCW systems. The staff verified that the applicant had identified and highlighted system flow and control drawings to develop the system boundaries in accordance with the procedural guidance. The applicant was knowledgeable concerning the process and conventions for establishing boundaries as defined in the license renewal implementation procedures. Additionally, the staff verified that the applicant had independently verified the results in accordance with the governing procedures. Specifically, other personnel knowledgeable of the system had independently reviewed the marked-up drawings to ensure accurate identification of system intended functions. The staff performed additional cross-discipline verification and independent reviews of the resultant highlighted drawings before final approval of the scoping effort.

Conclusion. The staff determined that the applicant's methodology was consistent with the description provided in LRA Section 2.1.4 and that the guidance contained in SRP-LR Section 2.1 was adequately implemented. On the basis of the applicant's detailed scoping implementation procedures and a sampling review of mechanical components scoping results, the staff concluded that the applicant's methodology for identifying mechanical components within the scope of license renewal met the requirements of 10 CFR 54.4(a).

Structural Component Scoping. The applicant performed its structural scoping in accordance with the detailed methodology defined in 0-TI-457, "Civil Technical Evaluations for License Renewal," Revision 2. The scoping procedure was used to evaluate SSCs to identify their functions and determine which are intended functions required for compliance with one or more criteria of 10 CFR 54.4(a)(1)-(3). Initial identification of BFN structures was accomplished by reviewing BFN drawing 0-10E21-series and/or Maintenance Rule documentation, 0-TI-346. For each structure, the applicant further reviewed the drawings and plant databases to identify specific structural components and features. The structural component intended functions for SCs within the scope of license renewal were identified based on the guidance provided in Regulatory Guide (RG) 1.188, "Standard Format and Content for Applications to Renew Nuclear Power Plant Operating Licenses," NEI 95-10, and the SRP-LR. The procedure also described the source design documentation to be used for the evaluation of structures meeting the 10 CFR 54.4(a) criteria including the UFSAR, general design criteria (GDC) document, and other appropriate documents. For civil structures, the evaluation boundaries were determined by developing a complete description of each structure with respect to the intended functions performed by the structure and its components. A license renewal database was created for use in compiling the structural scoping results. The database contained (1) a unique identification number for each structure, (2) a list of structural components or commodity types associated with the structure, (3) evaluation results for each of the 10 CFR 54.4(a)(1)-(3) criteria for the structure, (4) a description of structural intended functions and source reference information for the functions, and (5) a reference to pertinent license renewal drawings associated with each structure.

License renewal procedure 0-TI-457 was also used to define the evaluation boundaries and discipline interfaces for civil/mechanical and civil/electrical systems. With respect to the civil/mechanical interface, the procedure identified the following component types within mechanical systems that were evaluated as part of the civil review. These component types included: (1) piping system supports, (2) HVAC duct supports, (3) equipment supports and foundations, (4) bolting and fasteners for structural supports and mechanical fasteners that are required for mechanical closure of mechanical components, and (5) whip restraints and jet impingement shields.

With respect to the civil/electrical interface, the procedure identified the following component types within electrical systems that were evaluated as part of the civil review. These component types included: (1) cable trays and supports, (2) conduits and supports, (3) electrical cabinets, panels, racks, and other enclosures providing structural integrity, (4) instrument racks, panels, frames, and enclosures providing structural integrity, and (5) electrical and I&C penetrations providing structural support functions.

The staff conducted detailed discussions with the applicant's license renewal project personnel and reviewed documentation pertinent to the scoping process. The staff assessed whether the scoping methodology outlined in the LRA and implementation procedures were appropriately implemented and whether the scoping results were consistent with CLB requirements. The staff also reviewed several plant structural evaluation results for the reactor building and turbine building to verify proper implementation of the scoping process for structural components. The staff also compared a sample of structural components identified in the drawings to the structural list in the license renewal data base to ensure consistency. Based on these audit activities, the staff did not identify any discrepancies between the methodology documented and the implementation results.

Conclusion. The staff determined that the applicant's methodology for structural scoping was consistent with the description provided in LRA Section 2.1.4.3 and the guidance contained in the SRP-LR Section 2.1. Based on a review of information contained in the LRA, the applicant's detailed scoping implementation procedures, and a sampling review of structural component scoping results, the staff concluded that the applicant's methodology for identification of structural components within the scope of license renewal met the requirements of 10 CFR 54.4(a).

Electrical and I&C Scoping. The staff reviewed 0-TI-456, "Electrical Technical Evaluations For License Renewal," which describes the electrical and I&C scoping and screening process and discussed the methodology and results with the applicant's cognizant engineers. With the exception of components in the SBO offsite power restoration flow path, plant electrical and I&C components were evaluated using a "spaces" approach. The spaces approach identifies the electrical and I&C commodity groups that are installed in the plant and the limiting environmental conditions for each group. The spaces approach then determines if any area environment is more severe than the limiting environment for the commodity group. If the area environment is more severe than a commodity group's limit, and if a component in the commodity group is actually located in the area, an AMR is required for that commodity group.

For this LRA, the applicant used a bounding spaces approach, as described in NEI 95-10. Electrical and I&C component types used plant-wide were identified without regard to the plant system they are in. The applicant used the listing provided by NEI 95-10, Appendix B as the

basis for this list. Electrical component types were identified from the plant controlled computer database, EMPAC. Then these component types were assembled into commodity groups such as breakers, switches, and cables using the NEI 95-10, Appendix B list as a starting point. The EMPAC database has a fine division of component titles based on component performance characteristics, so sub-commodity groups were formed to separate components into specific groups with common applications or materials. Thus under the commodity group, "circuit breakers," there may be a number of sub-commodity groups including all the circuit breakers identified in EMPAC as having common application, operating characteristics, fabrication materials, etc. The result is a detailed list by commodity and sub-commodity of all electrical and I&C components installed in the plant.

An exception to the spaces approach was the identification of electrical and I&C equipment needed for the SBO event offsite power restoration. Using the intended-function approach, the applicant developed license renewal drawings showing the basic electrical distribution paths for SBO offsite power restoration. Plant operating procedures were used to develop these SBO offsite power restoration license renewal drawings and to identify the components required to perform the function. The staff determined that the scoping and screening methodology used in O-TI-456, "Electrical Technical Evaluations For License Renewal"; and described by the applicant's engineers during the audit provided adequate guidance, was consistent with the requirements of 10 CFR 54.4 for the scoping evaluation of electrical components.

Conclusion. The staff determined that the applicant's methodology for electrical and I&C scoping was consistent with the description provided in LRA Section 2.1.4.2 and the guidance contained in the SRP-LR. Based on review of information contained in the LRA, the applicant's detailed scoping implementation procedures, and a sampling review of electrical component scoping results, the staff concluded that the applicant's methodology for identification of electrical and I&C components within the scope of license renewal met the requirements of 10 CFR 54.4(a).

### **2.1.3.2 Screening Methodology**

The staff reviewed the screening methodology used by the applicant to determine if mechanical, structural, and electrical components within the scope of license renewal would be subject to further aging management evaluation. The applicant described the screening methodology in LRA Section 2.1.5. In general, the applicant's screening approach consisted of evaluations to determine which structures and components within the scope of LRA were passive and long-lived. Passive and long-lived structures and components were then subject to an AMR.

The staff evaluated the applicant's screening methodology against criteria contained in 10 CFR 54.21(a)(1) and 10 CFR 54.21(a)(2) using the review guidance contained in SRP-LR Section 2.1.3.2, "Screening." The staff evaluation of the applicant's screening approach for each of these disciplines is discussed below.

#### **2.1.3.2.1 Mechanical Component Screening**

The staff reviewed the methodology used by the applicant to determine if mechanical components within the scope of license renewal would be subject to further AMR. For

mechanical components, the applicant applied a screening process to each mechanical system determined to be within the scope of license renewal in order to determine the types of mechanical component commodities within the systems and the various materials and environments to be considered in the AMR. The applicant then established evaluation boundaries for the various plant mechanical systems in order to further identify individual mechanical components for review.

The listing of mechanical components was facilitated by combining these items into commodity groups from a review of each boundary drawing. The applicant placed these commodity groups into the license renewal database and evaluated them in accordance with the screening criteria described in O-TI-455. The applicant provided the staff with a detailed discussion of the process and provided screening report information from the license renewal database that described the screening methodology, as well as a sample of the screening results reports for a selected group of SR and NSR systems. The staff determined that the screening methodology was consistent with the requirements of the Rule and that implementation of the methodology will identify SCs that meet the screening criteria of 10 CFR 54.21(a)(1).

During the audit, the staff reviewed the methodology used by the applicant to identify and list the mechanical components and commodities subject to an AMR, as well as the applicant's technical justification for this methodology. The staff discussed the methodology and results with the applicant's cognizant engineers and senior staff. The staff also examined the applicant's results from the implementation of this methodology by reviewing a sample of the mechanical systems identified as within the scope of license renewal. These systems included the RHRSW system and EECW system. The review included the evaluation boundaries and resultant in-scope components, the corresponding component-level intended functions, and the resulting list of mechanical components and commodity groups subject to an AMR.

The staff reviewed several summary screening reports, which list a breakdown of the mechanical components that are within the scope of license renewal. Each report lists several categories, including component type, component material, whether an AMR is required, and an extensive comment section. The staff also reviewed a sample of the mechanical drawing packages assembled by the applicant and discussed the process and results with the cognizant engineers who performed the review. The staff did not identify any discrepancies between the methodology documented and the implementation results.

Conclusion. The staff determined that the applicant's mechanical component screening methodology was consistent with the guidance contained in the SRP-LR and was capable of identifying those passive, long-lived components within the scope of license renewal that are subject to an AMR.

#### 2.1.3.2.2 Structural Component Screening

The staff reviewed O-TI-457, "Civil Technical Evaluations For License Renewal," which outlined the applicant's methodology to determine if SCs within the scope of license renewal would be subject to an AMR. The screening process applied to in-scope buildings and civil structures was designed to determine the structural elements and construction materials, as well as to determine the environments to which these buildings and civil structures will be exposed so that these factors could be considered in the AMR. Engineering document O-TI-457 Section 6.3, "Structures Screening," describes the guidance for the structural screening process. For all

structural component types with intended functions, the applicant then determines if the component type is long-lived. The applicant used existing plant program procedures and operating experience to determine if the component type was subject to replacement based on a qualified life or whether it was long-lived.

During the audit of the applicant's license renewal scoping and screening process, the staff reviewed the methodology used by the applicant to identify and list the structural components and structural commodities subject to an AMR as well as the applicant's technical justification for this methodology. The staff discussed the methodology and results with the applicant's cognizant engineers and senior staff. The applicant provided the staff with a detailed discussion of the process and provided technical reports that described the screening methodology as well as a sample of the screening results for a selected group of structures.

The staff also examined the applicant's results from the implementation of this methodology by reviewing a sample of the reactor building and turbine building plant structures identified as being within the scope of license renewal. The review included the evaluation boundaries and resultant in-scope components, the corresponding component-level intended functions, and the resulting list of structural components and structural commodity groups subject to an AMR.

Conclusion. The staff determined that the applicant's structural component screening methodology was consistent with the guidance contained in the SRP-LR and was capable of identifying those passive and long-lived components within the scope of license renewal that are subject to an AMR.

#### 2.1.3.2.3 Electrical Component Screening.

The staff reviewed the applicant's procedure 0-TI-456, "Electrical Technical Evaluations For License Renewal," which provided guidance on the screening of electrical and I&C components. The applicant used a bounding spaces approach as described in NEI 95-10, Revision 3, to perform the electrical evaluation. The electrical and I&C component types were identified from EMPAC. These component types were assembled into commodity groups such as breakers, switches, and cables using the NEI 95-10, Appendix B, list and supplemented with site-specific information. The applicant then applied the screening criteria to determine those electrical commodities subject to an AMR.

The staff discussed the methodology and results with the applicant's cognizant engineers and senior staff. The staff also examined the applicant's results from the implementation of this methodology by reviewing several electrical and I&C commodity reports and samples from the license renewal database. The review verified that the applicant's staff had consistently applied the screening criteria to identify those electrical and I&C commodity groups subject to an AMR. The staff determined that the electrical screening process was consistent with criteria in 10 CFR 54.21(a)(1)(ii) and excluded those components or commodity groups that are subject to equipment qualification requirements. The staff did not identify any discrepancies between the methodology documented and the implementation results.

The staff also reviewed the applicant's approach to scoping and screening of electrical fuse holders. In license renewal ISG-5, "Identification and Treatment of Electrical Fuse Holders for License Renewal," dated March 10, 2003, the staff stated that, consistent with the requirements specified in 10 CFR 54.4(a), fuse holders (including fuse clips and fuse blocks) are considered

to be passive electrical components. Fuse holders would be scoped, screened, and included in the AMR in the same manner as terminal blocks and other types of electrical connections that are currently being treated in the process. This staff position applies only to fuse holders that are not part of a larger assembly, but support SR and NSR functions in which the failure of a fuse precludes a safety function from being accomplished (10 CFR Part 54.4(a)(1) and 10 CFR 54.4(a)(2)). As described in LRA Sections 2.1.8.5, and 3.6.2.3.1, the applicant developed a process for identifying and evaluating fuse holders as part of its license renewal evaluation. The process included using EMPAC to identify fuses in the plant and then to apply a series of evaluations and screening to identify a subset of the plant fuses which would potentially be susceptible to various effects of moisture or chemical contamination, thermal cycling, vibration, and mechanical stress. The applicant evaluated plant operating experience and determined that fatigue due to mechanical stress was an applicable aging effect/mechanism. The applicant then evaluated all remaining fuses to determine if any were susceptible to mechanical stress. The staff reviewed the applicant's process for identifying and evaluating the fuse holders and determined it was adequate.

Conclusion. The staff determined that the applicant's electrical and I&C screening methodology was consistent with the guidance contained in the SRP-LR and was capable of identifying passive, long-lived components within the scope of license renewal that are subject to an AMR.

#### **2.1.4 Conclusion**

The staff's review of the information presented in LRA Section 2.1, the supporting information in the scoping and screening implementation procedures and reports, the information presented during the scoping and screening methodology audit, and the applicant's responses to the staff's RAIs formed the basis of the staff's safety determination. The staff verified that the applicant's scoping and screening methodology was consistent with the requirements of the Rule and the staff's position on the treatment of NSR SSCs.

On the basis of this review, the staff concluded that there is reasonable assurance that the applicant's methodology for identifying the SSCs within the scope of license renewal and the structures and components requiring an AMR is consistent with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

## **2.2 Plant-Level Scoping Results**

### **2.2.1 Introduction**

In LRA Section 2.1, the applicant described the methodology for identifying the systems and structures (SSs) within the scope of license renewal. In LRA Section 2.2, the applicant used the scoping methodology to determine which of the SSs are required to be included within the scope of license renewal. The staff reviewed the plant-level SSs relied upon to mitigate DBEs, as required by 10 CFR 54.4(a)(1), or whose failure could prevent satisfactory accomplishment of any of the SR functions, as required by 10 CFR 54.4(a)(2), as well as the SSs relied on in safety analyses or plant evaluations to perform a function that is required by any of the regulations referenced in 10 CFR 54.4(a)(3).

### **2.2.2 Summary of Technical Information in the Application**

In LRA Tables 2.2.1 and 2.2.2, the applicant provided a list of the plant systems and structures, respectively, identifying those that are within the scope of license renewal and those that are not within the scope of license renewal. Based on the DBEs considered in the plant's CLB, other CLB information relating to NSR systems and structures, and certain regulated events, the applicant identified those plant-level systems and structures that are within the scope of license renewal, as defined by 10 CFR 54.4.

### **2.2.3 Staff Evaluation**

In LRA Section 2.1, the applicant described its methodology for identifying the systems and structures that are within the scope of license renewal and subject to an AMR. The staff reviewed the scoping and screening methodology and provided its evaluation in the safety evaluation report (SER) Section 2.1. To verify that the applicant properly implemented its methodology, the staff focused its review on the implementation results, as shown in LRA Tables 2.2.1 and 2.2.2, and added systems due to the changed scoping methodologies to confirm that there were no omissions of plant-level systems and structures within the scope of license renewal.

In response to RAI 2.1-2A(3), described in SER Section 2.1, the applicant revised the methodology used to determine the NSR SSCs to be included in the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2). The applicant's response to RAI 2.1-2A(3) and supplemental information related to implementation of the revised scoping methodology are documented in the applicant's response, dated February 28, 2005. As a result of the implementation of the scoping methodology changes, the applicant expanded the scope of license renewal and added the following mechanical systems that had additional in-scope piping or components:

- condensate and demineralized water system
- containment system
- reactor building closed cooling water system
- auxiliary decay heat removal system
- fuel pool cooling and cleanup system
- CO<sub>2</sub> system

- sampling and water quality system
- off-gas system
- radioactive waste treatment system
- diesel generator starting air system

The applicant also added the following structures to the scope of license renewal:

- radwaste building
- service building

In response to a follow-up question of RAI 2.1-2A(1), dated May 31, 2005, described in SER Section 2.1, the applicant provided supplemental information on the implementation of the revised scoping methodology of NSR piping segments that support secondary containment penetrations qualified to seismic Class II pressure retention requirements.

As a result of the implementation of the scoping methodology changes, the applicant added the following mechanical systems that had additional piping or components added to the scope of license renewal:

The following mechanical systems only had systems boundary changes. No new component types, materials, or environments that affected either the scoping/screening or AMR results in the LRA were added.

- main steam system
- auxiliary boiler system
- raw cooling water system
- station drainage system
- high pressure coolant injection system
- residual heat removal system
- radioactive waste system
- fuel pool cooling and cleanup system
- radiation monitoring system

The following mechanical systems had systems boundary changes. For some of these systems, new component types were added that affected the scoping/screening results in the LRA. For all systems listed, new components, materials or environments that affected the AMR results in the LRA were added.

- condensate and demineralized water system
- feedwater system
- potable water system
- service air
- containment system

The remainder of the mechanical systems were not affected by this review.

The staff reviewed the selected systems and structures that the applicant had not identified as falling within the scope of license renewal to verify whether the systems and structures have any intended functions that would require their inclusion within the scope of license renewal in accordance with 10 CFR 54.4. The staff's review of the applicant's implementation was

conducted in accordance with the guidance described in SRP-LR Section 2.2, “Plant-Level Scoping Results.”

The staff sampled the contents of the UFSAR based on the systems and structures listed in LRA Tables 2.2.1 and 2.2.2 to determine whether there are any systems or structures that may have intended functions within the scope of license renewal, as defined by 10 CFR 54.4, but were omitted from within the scope of license renewal. The staff did not identify any omissions.

#### **2.2.4 Conclusion**

The staff reviewed LRA Section 2.2 and the supporting information in the UFSAR to determine whether any systems and structures within the scope of license renewal had not been identified by the applicant. The staff's review did not identify any omissions. On the basis of this review, the staff concluded that the applicant had properly identified the systems and structures that are within the scope of license renewal in accordance with 10 CFR 54.4.

## **2.3 Scoping and Screening Results: Mechanical Systems**

This section documents the staff's review of the applicant's scoping and screening results for mechanical systems. Specifically, this section discusses the following mechanical systems:

- reactor coolant systems
- engineered safety features
- auxiliary systems
- steam and power conversion systems

In accordance with the requirements of 10 CFR 54.21(a)(1), the applicant must identify and list passive, long-lived structural SSCs that are within the scope of license renewal and subject to an AMR. To verify whether the applicant has properly implemented its methodology, the staff focused its review on the implementation results. This approach allowed the staff to confirm that there were no omissions of mechanical system components that meet the scoping criteria and are subject to an AMR.

In the LRA, the applicant described a methodology for mechanical systems scoping and screening that interprets 10 CFR 54.21(a) differently from previous LRAs and the SRP-LR. Specifically, the applicant did not define component-level scoping boundary. The applicant combined passive, long-lived, and intended function criteria into one screening process to meet the requirements of 10 CFR 54.21(a)(1). The applicant highlighted those components on the license renewal drawings that are passive, long-lived, and have intended functions as being subject to an AMR. Therefore, some of the components that have intended functions may not be identified and listed in the LRA Section 2.3 tables or highlighted on the license renewal drawings, because the component scoping boundary is not defined.

The methodology used by previous LRA applicants, consistent with the SRP-LR review guidance, describes two steps to perform scoping and screening. The first step, scoping, identifies those SSCs within the scope of license renewal in accordance with 10 CFR 54.4(a). The applicant then identified the components of the in-scope system that have intended functions to be included in the license renewal scope in accordance with the criteria of 10 CFR 54.4(a). The component scoping boundary within a system is then highlighted on license renewal drawings. The second step, screening, identifies those components in the scoping boundary that are passive and long-lived in accordance with 10 CFR 54.21(a)(1). The resulting components from these scoping and screening steps are subject to an AMR. This matter was further complicated because the drawings for Unit 1 only highlighted those portions of the system that are subject to an AMR and are not expected to change as a result of modifications needed to bring the CLB for Unit 1 in line with Units 2 and 3.

Because the applicant used a different scoping and screening process and provided insufficient information in its LRA associated with this methodology, the staff was unable to determine whether there were any omissions of components from the scope of license renewal and subject to an AMR. The applicant did not provide scoping information at the component level equivalent to that provided by previous LRA applicants for the review of systems in LRA Section 2.3.

To better understand the applicant's scoping methodology, the staff conducted an audit review at the TVA offices in Chattanooga, TN, between June 7 and 10, 2004, to review the applicant's license renewal project guidelines and procedures. The purpose of this plant audit was to determine, by review of plant information, that system components within the scope of license renewal are identified and that the components of the in-scope systems subject to an AMR are screened. The staff reviewed the applicant's site documentation in the following areas:

- department procedure for license renewal technical evaluations
- mechanical technical evaluations for license renewal
- SBO calculations
- system reports

To ensure that all components of an in-scope system were screened, or identified as passive and long-lived in accordance with 10 CFR 54.21(a)(1), the staff audited the system report for the main steam system. Additionally, the staff reviewed the SBO calculations to determine if any systems were omitted from scope in accordance with 10 CFR 54.4(a)(3). In its trip report, the staff documented which procedures and reports were reviewed at the plant site.

As a result of the staff's review of LRA Section 2.3, the staff found that additional clarification was needed to determine whether the applicant's mechanical component-level scoping for the in-scope systems was adequate. Therefore, by letter dated August 31, 2004, the staff issued RAIs to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a). The following paragraphs describe the staff's RAIs and the applicant's responses.

In RAI 2.3-1, the staff stated that many of the tables in LRA Section 2.3 list "fittings" as a component type subject to an AMR. The term "fittings" typically refers to components such as elbows, tees, unions, reducers, caps, flanges, etc., which are an integral part of piping systems. LRA Section 2.3.5 lists other components that fall under the component type "fittings" but does not list the above components. Therefore, the staff requested the applicant to confirm that components such as those listed above are considered as part of the component type "fittings" in the LRA tables, or to state if they are considered as part of another listed component type.

In its response, by letter October 19, 2004, the applicant stated that elbows, tees, unions, reducers, caps, flanges, etc., are not typically shown with UNIDs on the license renewal drawings, and that they were not listed in LRA Section 2.3.5. LRA Section 2.3.5 was generated to help identify components that are shown on boundary drawings, have a specific UNID, and are included in a commodity. The applicant further stated that components such as elbows, tees, unions, reducers, caps, flanges, quick disconnects, thermal sleeves, aux heads, and drains are included in commodity type "fittings."

Based on its review, the staff found the applicant's response to RAI 2.3.-1 acceptable. It confirms that the components addressed in the RAI are already included in the component type "fittings" as being subject to an AMR. Therefore, the staff's concern described in RAI 2.3-1 is resolved.

In RAI 2.3-2, the staff stated that LRA Section 2.1.7.9, Group (c) states that “oil, grease, and component filters” are short-lived and are periodically replaced. It further states that various plant procedures are used in the replacement of oil, grease, and component filters that are within the scope of license renewal. In the process of verifying the results of the above applicant’s methodology, the staff raised the following questions.

Because the LRA uses AMR boundary drawings instead of scoping boundary drawings, the components that are within the scope of license renewal but not subject to an AMR are not highlighted on the drawings. Therefore, the staff was unable to determine, for mechanical systems, whether all in-scope oil, grease, and component filters had been identified in accordance with 10 CFR 54.4. Additionally, the staff could not determine whether plant procedures exist and are adequate for the all in-scope “oil, grease, and component filters” that are not subject to an AMR. For example, “crane system” is within the scope of license renewal in accordance with 10 CFR 54.21(a)(2); however, filters of the system are not listed in LRA Table 2.3.3.34 as component types subject to an AMR. Additionally, no drawings were provided for this system. The staff could not determine whether this system contains any in-scope oil, grease, and component filters, or whether the plant procedures are adequate for them. Therefore, in RAI 2.3-2, the staff requested the applicant to do the following:

1. Verify all the in-scope oil, grease, and component filters that are identified in the license renewal boundary drawings. If not, list those in-scope oil, grease, and component filters that are not identified in the drawings.
2. Identify the plant procedures that are used for the replacement of every in-scope oil, grease, and filter that is not subject to an AMR to demonstrate that the oil, grease, or filter is replaced on a periodic basis and identify the specific period.
3. Identify those in-scope oil, grease, and component filters without proper plant procedures that are subject to an AMR.

In its response, by letter October 19, 2004, the applicant stated:

1. The boundary drawings were not intended to depict oil or grease. All filters associated with mechanical systems are not depicted on boundary drawings. The boundary drawings are based on flow diagrams which depict components in the system fluid flow path (i.e., pressure boundary). Even though most discrete components are shown on the flow diagrams, the flow diagrams show various levels of detail associated with vendor supplied skids. For example, some flow diagrams associated with vendor supplied skids show the associated lubricating oil and cooling water components (i.e., filters, pumps, etc.). Other flow diagrams may only depict the major component in the flow path, such as a heat exchanger associated with a vendor supplied chiller package. The refrigerant loop associated with the vendor supplied chiller unit is not depicted on the flow diagram. Vendor drawings and vendor manuals provide details associated with the vendor supplied equipment. In these cases, the vendor documents were utilized to identify components, such as filters, that are subject to aging management review. Examples of filters that were subject to an AMR that were not shown on drawings are: Unit 1 reactor core isolation cooling system lube oil filters; Unit 1 high pressure coolant injection system lube oil filters; and filters

associated with the refrigerant loop of heating ventilation and air condition system chillers.

2. Browns Ferry has various maintenance procedures and work orders in place to assure that filters for safety related components are being monitored and replaced as required to assure that equipment will perform its function. Some examples of procedures used to replace the elements are: MPI-0-026-INS002 which is performed annually or 250 hour cumulative inspection, MPI-0-82-INS002 which performs the Standby Diesel Engine 24 month inspection, procedure 0-GI-300-1 Attachment 15.11 which is the Monthly Ventilation Filter Check, repetitive work orders done every 24 weeks, 0-SI-4.8.B.2-1 which is performed weekly, MPI-0-071-TRB001 and repetitive work order every 24 months, and MPI-0-073-TRB001 and repetitive work order every 12 weeks. Browns Ferry has various preventive maintenance procedures and work orders in place to assure that oil and grease for safety related components are being monitored and replaced as required to assure that equipment will perform its function. The following are examples of procedures that are used for oil and grease replacement: QMDS NUMBER MOV-001 (performed every 54 months), QMDS NUMBER MOV-002 (performed every 54 months), QMDS NUMBER MOV-003 (performed every 54 months), QMDS NUMBER MOT-001 (perform oil samples every six months), QMDS NUMBER MOT-003 (performed at 24 and 36 month intervals), QMDS NUMBER PLN-003 (performed every 3 years), EPI-0-000-MOT- 001 (Preventive Maintenance work orders are generated at various frequencies to add grease to motors), EPI-0-000- MOT-002 (Preventive Maintenance work orders are generated at various frequencies to add oil to motors), and MPI-0- 000-LUB001 (Preventive Maintenance work orders are generated at various frequencies to add grease to equipment). In addition, some components lubricants are monitored and replaced based on oil analysis (predictive maintenance).
3. Our review did not identify any cases where oil, grease, or in scope filters were without proper plant procedures to exclude them as short lived.

In the initial response review, the staff was unable to find the applicant's response to RAI 2.3-2 acceptable. The applicant did not provide sufficient information to provide reasonable assurance that all oil, grease and component filters are either outside the scope of license renewal or are replaced based on a qualified life or specified time period. By letter dated May 18, 2005, the applicant revised its response to state that it has various maintenance procedures and work orders in place to assure that all filters for SR components are being monitored and replaced as required to assure that the equipment will perform its function.

Based on its review, the staff found the applicant's revised response acceptable. There is reasonable assurance that all filters for SR components are covered by procedures or work orders. Therefore, the staff's concerns described in RAI 2.3-2 are resolved.

In RAI 2.3-3, the staff stated that LRA Section 2.1.7.2 states that insulation at BFN does not have an intended function associated with the scoping requirements of 10 CFR 54.4(a)(1) through (a)(3). However, there is insufficient information in the LRA and the UFSAR for the staff to determine if the statement is valid at such a generic level. Insulation may be required for a variety of reasons, e.g., systems efficiency, heat-load calculations, EQ purposes. etc. If the

insulation is relied upon for EQ purposes, the passive, long-lived insulation should be within the scope of license renewal and subject to an AMR. Therefore, the staff requested that the applicant provide a basis for not including any piping or equipment insulation within the scope of license renewal.

On March 22, 2005, the staff held a teleconference with the applicant to discuss the treatment of insulation. In its response, by letter May 18, 2005, as modified by letter dated June 15, 2005, the applicant stated that all the mechanical piping and equipment insulation contained in the SR structures as well as some NSR structures have been added to the scope of license renewal, since they meet the criteria of 10 CFR 54.4(a)(2) and (a)(3). Piping and equipment insulation has the intended functions of insulate and integrity. The applicant stated that these intended functions will be added to LRA Table 2.0.1. The applicant also stated that piping and equipment insulation and insulation jacketing are component types that are subject to an AMR. LRA Table 2.1.7.2 will be added to reflect these two component types and their intended functions.

Based on its review, the staff found the applicant's response to RAI 2.3-3 acceptable. The applicant placed all piping and equipment insulation that is within SR and some NSR structures within the scope of license renewal and the insulation is subject to an AMR. Therefore, the staff's concern described in RAI 2.3-s3 is resolved.

The staff reviewed LRA Section 2.3 and the applicant's responses to the RAIs and performed a plant audit. Based on this review, the staff found that the applicant's methodology for scoping and screening was well documented in an auditable and retrievable form at the plant site. The staff also found that the results of the audit on the system and the regulated event confirmed that there were no omissions of any components subject to an AMR for the audited systems. In the LRA Section 2.3 tables, the staff found that the results are consistent with the methodology and are acceptable. With the additional information obtained from responses to RAIs 2.3-2 and 2.3-3, the staff concluded that the applicant, while using a different methodology from that described in the review guidance of the SRP-LR, provided scoping and screening results and components subject to an AMR with no omissions. For other in-scope systems that were not audited at the plant site, the staff issued RAIs related to components that could be subject to an AMR based on its review of the LRA, UFSAR, and site documentation.

In RAIs 2.1-2A(1) and (2) (described in SER Section 2.1) of the July 30, 2004, letter, the staff requested that the applicant describe the criteria used to determine that the integrity of in-scope piping functions (in the reactor building) is preserved if a potential age-related degradation failure occurred on the attached NSR piping (in the turbine building), given that the NSR piping is not in scope and piping is not anchored, and 2) explain how it determined that the SR piping (in the reactor building) is supported so that it would remain functional if a potential age-related degradation occurred on the NSR piping (in the turbine building) attached to it. In its response dated, October 18, 2004, the applicant committed to review the CLB requirements and identify the piping, supports and other components outside secondary containment required to maintain the structural integrity of the secondary containment. The applicant committed to performing this review prior to the period of extended operation. The deferral of this issue until prior to the period of extended operation is unacceptable. Therefore, the applicant performed the review, the results of which are documented in a letter dated May 31, 2005. The following mechanical

systems only had systems boundary changes (i.e., no new component types, materials, or environments were added) that affected either the scoping/screening or AMR review results in the LRA:

- main steam system
- auxiliary boiler system
- raw cooling water system
- station drainage system
- high pressure coolant injection system
- residual heat removal system
- radioactive waste system
- fuel pool cooling and cleanup system
- radiation monitoring system

The following mechanical systems had systems boundary changes; however, for some of these systems, new component types were added that affected the scoping/screening results in the LRA. For all systems listed, new components, materials, or environments were added that affected the AMR review results in the LRA:

- condensate and demineralized water system
- feedwater system
- potable water system
- service air system
- containment system

The effects of these changes are evaluated and discussed in the corresponding sections of the SER.

In RAI 2.1-2A(3), described in SER Section 2.1, dated July 30, 2004, the staff requested that the applicant describe how the scoping and screening methodology ensured that NSR piping up to the first equivalent anchor point was included within the scope of license renewal. The applicant in its initial response to RAI 2.1.2A(3), dated September 3, 2004, committed to review the seismic Class I piping boundaries and identify any additional piping segments and supports/equivalent anchors that were needed to be placed within the scope of license renewal.

On September 24, 2004, in a teleconference between the staff and the applicant, the staff requested that the applicant provide additional information related to the methodology to be utilized to ensure the liquid-filled NSR piping up to the first equivalent anchor point was captured. By letter, dated January 31, 2005, the applicant stated that an extensive review was performed that included verification of each seismic Class I boundary that typically falls into one of the following categories: base-mounted equipment, pipe anchor, embedded piping segment, large run line, piping free end, flexible connection and overlap regions. Any identified piping, supports/equivalent anchors, or other components would be added to the scope of license renewal as needed.

In a letter dated February 28, 2005, the applicant provided final status information and results from the calculation review requested by the staff. In enclosure 1 of the letter, the applicant provided a summary of the following changes to the LRA as a result of this review.

The mechanical systems listed below had additional piping or components added to the scope of license renewal; however, even for those systems that had boundary changes as a result of the additional piping and components, no changes to the LRA were required, because the component-material-environment-program combination was already addressed in the LRA.

- condensate and demineralized water system
- standby liquid control system
- containment system
- reactor building closed cooling water system
- auxiliary decay heat removal system
- fuel pool cooling and cleanup system

The following mechanical systems also had additional piping or components added to the scope of license renewal. However, for these systems with boundary changes because of the addition of piping and components, changes to the LRA were required, because the component-material-environment-program combination was not addressed in the LRA.

- CO<sub>2</sub> system
- sampling and water quality system
- off-gas system
- radioactive waste treatment system
- diesel generator starting air system

The effect of these changes are evaluated and discussed in the corresponding sections of the SER (see Section 2.3.4.4 for details of RAls 2.3.4.4-1 and 2.3.4.4-2).

### **2.3.1 Reactor Coolant Systems**

In LRA Section 2.3.1, the applicant identified the structures and components of the reactor coolant systems (RCSs) that are subject to an AMR for license renewal.

The applicant described the supporting structures and components of the RCSs in the following sections of the LRA:

- 2.3.1.1 reactor vessel
- 2.3.1.2 reactor vessel internals
- 2.3.1.3 reactor vessel vents and drains system
- 2.3.1.4 reactor recirculation system

The corresponding SER subsections, 2.3.1.1 - 2.3.1.4, present the staff's review findings.

#### **2.3.1.1 Reactor Vessel**

##### **2.3.1.1.1 Summary of Technical Information in the Application**

In LRA Section 2.3.1.1, the applicant described the reactor vessel. The reactor vessel provides a container for the reactor core and the primary coolant in which the core is submerged. Each unit has a separate reactor vessel. The reactor vessel is a pressure vessel with the geometry of

a vertically-aligned cylinder capped with hemispherical heads of welded construction. The cylindrical shell and bottom hemispherical head of the reactor vessel are fabricated from low-alloy carbon steel plate that is clad on the interior with weld overlay. The cylindrical shell is clad with stainless steel and the bottom hemispherical head is clad with Inconel. The vessel top head is not clad and is secured to the reactor vessel by studs and nuts. The vessel flanges are sealed by two concentric metallic seal-rings that are designed for no detectable leakage through the inner or outer seal at any operating condition.

The reactor vessel contains SR components that are relied upon to remain functional during, and following, DBEs to ensure the following intended functions:

- forms part of the reactor coolant pressure boundary
- provides physical support for the reactor core and the reactor vessel internals
- ensures a floodable volume and coolant distribution to mitigate accidents
- provides pressure boundary
- provides structural support

In LRA Table 2.3.1.1, the applicant identified the following reactor vessel component types that are within the scope of license renewal and subject to an AMR: attachments and welds, closure studs and nuts, heads, flanges, shell, nozzle safe ends, nozzles, other external attachments, penetrations, refueling bellows support skirt, stabilizer bracket, and support skirt and attachment welds.

#### 2.3.1.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.1 and the UFSAR Section 4.2, 7.8, and Appendices J, K, and L using the evaluation methodology described in SER Section 2.3. The staff conducted its review on the reactor vessel in accordance with the guidance described in SRP-LR Section 2.3, "Scoping and Screening Results - Mechanical Systems."

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.3.1.1.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the reactor vessel components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the reactor vessel components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.1.2 Reactor Vessel Internals**

#### **2.3.1.2.1 Summary of Technical Information in the Application**

In LRA Section 2.3.1.2, the applicant described the reactor vessel internals. The reactor vessel internals are unique to each unit and provide partitions between regions within the reactor vessel in order to provide proper coolant distribution, thereby allowing power operation without fuel damage due to inadequate cooling. The reactor vessel internals also provide positioning and support for the fuel assemblies, control rods, in-core flux monitors, and other components to assure that control rod movement is not impaired. In addition, the reactor vessel internals provide a floodable volume so that the core can be adequately cooled if there is an external reactor vessel breach in the nuclear system process barrier.

The reactor vessel internals consist of the following components:

- core shroud
- shroud head and steam separator assembly
- core support
- top guide
- fuel support pieces
- control rod guide tubes (control rod housing)
- jet pump assemblies
- steam dryers
- feed water spargers
- core spray lines and spargers
- vessel head spray nozzle
- differential pressure and liquid control line
- in-core flux monitor guide tubes
- startup neutron sources
- surveillance sample holders

The reactor vessel contains SR components that are relied upon to remain functional during, and following, DBEs to ensure the following intended functions:

- provides physical support for the reactor core and the reactor vessel internals
- ensures a floodable volume and coolant distribution to mitigate accidents
- provides pressure boundary
- provides spray pattern
- provides structural support

In LRA Table 2.3.1.2, the applicant identified the following reactor vessel internals component types that are within the scope of license renewal and subject to an AMR: core shroud and plate; core spray lines and spargers; control rod drive (CRD) housing; dry tubes and guide tubes; fuel support; jet pump assemblies; and top guide.

#### 2.3.1.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.2 and UFSAR Section 3.3, 4.2, and Appendices J, K, and L using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.1.2, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results.

In RAI 2.3.1.2-1, dated October 8, 2004, the staff requested the applicant to determine whether the scoping criteria of 10 CFR 54.4 (a) and the screening criteria of 10 CFR 54.21(a)(1) had been properly applied. The staff requested the following:

In LRA Table 2.3.1.2, one of the intended functions of core spray spargers was appropriately identified as maintaining the spray pattern in a manner that all fuel assemblies will be adequately cooled following a loss of coolant accident (LOCA). The staff's understanding is that adequate long-term core cooling following a LOCA can only be assured by retaining the original spray distribution over the core, which was assumed for the CLB. In the SER for the Boiling Water Reactor Vessel and Internals Project (BWRVIP)-18 report, the staff had concluded that, when performing inspection of core spray spargers, all boiling water reactor (BWR) plants must be treated as geometry-critical plants. Furthermore, it is staff's understanding that the previous BWRVIP designations of "geometry-tolerant" plants have been rescinded and all plants are now considered to be "geometry-critical." Consequently, in order to assure adequate cooling of the uncovered upper third of the core, the core spray system must provide adequate spray distribution to all assemblies in the core. The staff also believes that leakage through sparger and piping cracks, as well as repairs and potential blockage of spray nozzles must be considered in assessing the core spray distribution. As a result, it is essential that spraying water on the fuel assemblies in a pattern that was originally designed must be maintained, and that the applicant's aging management activities provide reasonable assurance that the original spray distribution will be preserved during the period of extended operation.

On the basis of the above discussion, the staff requests the applicant to affirm that when performing inspection of core spray spargers, the BFN plants are inspected in accordance to the requirements for the "geometry-critical" plants, as required by the staff SER for the BWRVIP-18 report; and that the original spray pattern assumed for the CLB will be preserved during the extended period of operation.

In its response, by letter dated November 3, 2004, the applicant stated that BFN is performing inspections as required by the BWRVIP-18 report, as modified by January 11, 1999, letter, which requires that core spray spargers of all plants receive the same type of inspection. The applicant also stated that, based on the Chemistry Control Program and that the nozzles are constructed of a stainless steel material, corrosion is not a credible aging mechanism to cause flow blockage.

Based on its review, the staff found the applicant's response to RAI 2.3.1.2-1 acceptable. The applicant included the subject components and their intended functions as within scope requiring an AMR. Therefore, the staff's concern described in RAI 2.3.1.2-1 is resolved.

Recent industry experience of steam dryer failures at operating BWRs and the potential of steam dryers to generate loose parts that can degrade SR components have necessitated that the staff reconsider whether steam dryers should be within the scope of license renewal, in accordance with 10 CFR 54.4(a)(2), and require aging management. Although the steam dryer does not perform an SR function, the steam dryer must maintain its structural integrity to support emergency core cooling system (ECCS) operation, and also to prevent the occurrence of loose parts in the reactor vessel or steam lines that could adversely affect plant operation.

In RAI 2.3.1.2-2, dated October 8, 2004, the staff requested the applicant to provide the following additional information:

- Whether the steam dryer designs at BFN and Quad Cities are similar. If not, the applicant was requested to describe the significant differences between the two designs that support the conclusion that steam dryer failures similar to those that occurred at Quad Cities are unlikely to develop at the BFN steam dryers following power uprate.
- Describe any actions, including analysis, that will be performed to confirm that extended power uprate<sup>1</sup> conditions will not generate loose parts from the steam dryer.

In its response, by letter November 3, 2004, the applicant stated that the steam dryers had been added within the scope of license renewal on the basis of 10 CFR 54.4(a)(2) scoping criterion. In addition, the applicant provided the following information to compare the configuration of the steam dryers at BFN with the configuration of the steam dryers at the Quad Cities Nuclear Power Station plants.

There are three general types of steam dryer configurations:

1. BWR/3-style steam dryers with a square hood and internal braces (This is the configuration at Quad Cities).
2. BWR/4-style steam dryers that have slanted hoods (This is the configuration at BFN).

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<sup>1</sup>TVA by letter dated January 7, 2005, agreed to decouple the power uprate licensing request from License Renewal Application. The safety review of this item will be further evaluated as part of the EPU review.

3. BWR/5 and later steam dryer designs that incorporate curved hoods to optimize the steam flow.

Basically the BFN dryer is a slanted hood design, which is much less susceptible to vibration-induced failures than the square hood design of the Quad Cities dryers. General Electric Corporation (GE) has conducted finite element model analysis, which documents that the square hood is more susceptible to operating stresses. The forcing function for the dryer loads has been identified as being primarily acoustic loads that originate in the steam lines. The BWRVIP and the industry have efforts underway to develop methods to measure and document the amount of additional loads that may be placed on the dryer as the result of uprated conditions. The applicant further stated that it will follow the BWRVIP guidelines for the inspection and evaluation of the dryers to insure their future integrity under uprated operating conditions.

The applicant added the subject components within the scope requiring an AMR and the staff's concerns described in RAI 2.3.1.2-2 are partly resolved. However, the subject of the second question of the staff RAI is currently being reviewed as part of the ongoing EPU review (see footnote previous page).

#### 2.3.1.2.3 Conclusion

The staff reviewed the LRA and RAI responses to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the reactor vessel internals components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the reactor vessel internals components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.1.3 Reactor Vessel Vents and Drains System**

#### 2.3.1.3.1 Summary of Technical Information in the Application

In LRA Section 2.3.1.3, the applicant described the reactor vessel vents and drains system. The reactor vessel vents and drains system consists of the valves and piping connected to the reactor coolant pressure boundary (RCPB). This includes the reactor vessel head vent piping, the reactor vessel bottom head drain piping, and the blowdown piping from the main steam relief valves (MSRVs) to the pressure suppression chamber. The system is unique to each unit and shares no components with other units. All piping and components are located within the primary containment.

The reactor vessel vents and drains system contains SR components that are relied upon to remain functional during, and following, DBEs to ensure the following intended functions:

- provides a path for the main steam (MS) system, safety relief valves (SRVs), and steam blowdown to the primary containment suppression pool
- provides RCPB

- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.1.3, the applicant identified the following reactor vessel vents and drains system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, RCPB fittings, piping, RCPB piping, valves, and RCPB valves.

#### 2.3.1.3.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.3 and UFSAR Sections 4.11, 7.8, and C.2 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.3.1.3.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the reactor vessel vents and drains system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the reactor vessel vents and drains system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.1.4 Reactor Recirculation System**

#### 2.3.1.4.1 Summary of Technical Information in the Application

In LRA Section 2.3.1.4, the applicant described the reactor recirculation system. The reactor recirculation system is unique to each unit and consists of two piping loops connected to, but external to, the reactor vessel. Each loop has a single, variable speed, motor driven pump with pump suction and discharge valves. Each pump takes suction from the reactor vessel downcomer region and discharges into a manifold that supplies flow to ten jet pumps contained within the reactor vessel. During normal operations, the system provides sufficient subcooled water to the reactor core to maintain the normal core operating temperatures. The system also provides control of reactor power by varying recirculation flow during normal operations. In addition, the system provides a flow path for the low pressure coolant injection flow from the

RHR system to the reactor vessel during design basis accidents (DBAs) and a flow path to and from the RHR system for removal of decay heat at low temperatures.

The reactor recirculation system contains SR components that are relied upon to remain functional during, and following DBEs. The failure of NSR SSCs in the reactor recirculation system could prevent the satisfactory accomplishment of an SR function. In addition, the reactor recirculation system performs functions that support fire protection, EQ, and ATWS.

The intended functions within the scope of license renewal include the following:

- provides RCPB
- provides a primary containment boundary
- restricts flow
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.1.4, the applicant identified the following reactor recirculation system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, RCPB fittings, flexible connectors, heat exchangers, piping, RCPB piping, pumps, reactor coolant pumps, restricting orifices, RCPB restricting orifices, strainers, tanks, tubing, valves, and RCPB valves.

#### 2.3.1.4.2 Staff Evaluation

The staff reviewed LRA Section 2.3.1.4 and UFSAR Sections 3.7.6, 4.3, 5.2.3, 7.8, 7.9, and 7.19 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.1.4, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. The staff requested the applicant to determine whether the scoping criteria of 10 CFR 54.4 (a) and the screening criteria of 10 CFR 54.21(a)(1) have been properly applied.

In RAI 2.3.1.4-1, dated October 8, 2004, the staff stated that in LRA Table 2.3.1.4, for the reactor recirculation system, and for other systems, for example, the containment inerting system, heat exchangers have been identified as a component type within the scope of license renewal. However, for these heat exchangers, the pressure boundary function was identified as the only intended function requiring aging management. Therefore, the staff requested the applicant to clarify why the heat transfer function was not also identified as an intended function

that needs to be maintained during the extended period of operation by assigning appropriate aging management program (AMP) for it.

In its response, by letter dated November 3, 2004, the applicant stated that the heat exchangers associated with LRA Table 2.3.1.4 are the heat exchangers shown on license renewal drawings 2-47E844-2-LR and 3-47E817-2-LR. The shell sides of these heat exchangers are within the scope of license renewal for secondary containment as a pressure boundary for the raw water system. These heat exchangers are not SR, but the tube side is within the scope of license renewal to satisfy 10 CFR 54.4(a)(2) requirements only. Therefore, these heat exchangers are not credited for their heat transfer function.

Based on its review, the staff found the applicant's response to RAI 2.3.1.4-1 acceptable. The applicant provided the justification as to why the heat transfer function of the subject components need not be within the scope of license renewal requiring aging management. Therefore, the staff's concern described in RAI 2.3.1.4-1 is resolved.

#### 2.3.1.4.3 Conclusion

The staff reviewed the LRA, the accompanying scoping boundary drawings, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the reactor recirculation system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the reactor recirculation system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### 2.3.2 Engineered Safety Features

In LRA Section 2.3.2, the applicant identified the structures and components of the engineered safety features (ESFs) that are subject to an AMR for license renewal.

The applicant described the supporting structures and components of the ESF in the following sections of the LRA:

- 2.3.2.1 containment systems
- 2.3.2.2 standby gas treatment system
- 2.3.2.3 high pressure coolant injection system
- 2.3.2.4 residual heat removal system
- 2.3.2.5 core spray system
- 2.3.2.6 containment inerting system
- 2.3.2.7 containment atmosphere dilution system

The corresponding SER subsections, 2.3.2.1 – 2.3.2.7, present the staff's review findings with respect to the ESF for BFN.

### **2.3.2.1 Containment System**

#### **2.3.2.1.1 Summary of Technical Information in the Application**

In LRA Section 2.3.2.1, the applicant described the containment system. The containment system includes the following subsystems: the primary containment and primary containment isolation system, the secondary containment, and the reactor building ventilation system. The scoping and screening results for the primary containment isolation valves for the various processes are presented within their respective systems. The results of the scoping and screening evaluations for the other components within the containment system including valves, piping, penetrations, structural steel, that are essential for primary containment integrity, are presented in other sections of this SER.

The primary containment system for each unit employs an independent pressure suppression that houses the reactor vessel, reactor coolant recirculation loops, and other branch connections of systems that form the RCPB. The Mark I containment is a pressure suppression system design, which consists of a drywell and a pressure suppression chamber that is alternatively referred to as the “torus” or “wetwell.” The Mark I pressure suppression system also contains a connecting vent system between the drywell and the pressure suppression chamber, isolation valves, equipment for establishing and maintaining a pressure differential between the drywell and pressure suppression chamber, and other service equipment. Air that is transferred to the pressure suppression chamber pressurizes the chamber and is subsequently vented to the drywell to equalize the pressure between the two vessels, and it is necessary in the event of a process system piping failure within the drywell. Cooling systems are provided to remove heat from the drywell and the water from the pressure suppression chamber, thus cooling and controlling the pressure in the primary containment under accident conditions. In addition, valves and flowpaths are provided to control the internal and the torus/drywell differential pressure. If long-term, post-accident cooling capability is lost, resulting in a pressure increase that would jeopardize the structural integrity of the primary containment, a hardened wetwell vent to the plant stack can be opened to relieve the pressure increase.

The containment system also includes the secondary containment system. The secondary containment system provides an essentially leak-tight envelope for any radiation release from the primary containment during DBEs. The secondary containment system also provides a primary envelope for radiation releases when the primary containment systems are open for refueling or maintenance.

This structure is divided into three reactor zones and a refueling zone. Each reactor zone houses the reactor, the primary containment, and the individual unit's ECCS. The structure also contains a spent fuel storage pool for each individual unit. The refueling zone allows continuous access to the three spent fuel storage pools and the reactor vessel for refueling and servicing.

The reactor building ventilation system is also included within the containment system. The reactor building is heated, cooled, and ventilated during normal and shutdown operations by a circulating air system. The reactor building ventilation system is shut down and isolated when a zone of secondary containment is isolated and connected to the standby gas treatment (SGT) system. The ventilation system has supply fans that provide makeup air that is filtered, heated by hot water coils for winter heating, and cooled by evaporative coolers for summer cooling. Air

is exhausted from the reactor building by exhaust fans located on the building's roof. Air from each zone is monitored before release. The reactor building ventilation system also includes area cooling units for areas containing ECCS components.

The containment system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the containment system could prevent the satisfactory accomplishment of an SR function. In addition, the containment system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides a primary containment boundary
- provides a vacuum relief system (vacuum breaker valves) to prevent drywell or suppression chamber (torus) negative pressure from damaging the containment structure
- provides air-operated re-closure of the inboard reactor building to the torus vacuum breakers
- provides pressure suppression by cooling/condensation of the safety relief valves (SRVs) steam from boiler drains and vents system and reactor core isolation cooling (RCIC) system and high pressure coolant injection (HPCI) system turbine exhaust steam
- accepts HPCI and RCIC system pump minimum bypass flow
- provides a water supply to the RCIC system, HPCI system, core spray (CS) system, and RHR system pumps
- provides forced air cooling for the RHR system and the CS system pump motors
- provides a secondary containment boundary (passive functions)
- provides a pressure boundary of containment system components connected to the control air system that must maintain the pressure boundary in support of supplying containment atmosphere dilution (CAD) to the main steam safety relief valves (MSRVs)
- provides fire dampers that are required for unit operation
- provides debris protection
- provides fire barrier
- provides for heat transfer
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.2.1, the applicant identified the following containment system component types that are within the scope of license renewal and subject to an AMR: bolting, ductwork, heat exchangers, fire dampers, flexible connectors, fittings, piping, strainers, traps, tubing, and valves.

#### 2.3.2.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.1, LRA Appendix F, and UFSAR Sections 5.2, 5.3, 5.3.3.2, 5.3.3.6, and 7.3, F.7.1, and F.7.11 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting the review, the staff reviewed the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.2.1, the staff identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. Therefore, by letter dated October 8, 2004, the staff issued an RAI concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 2.3.2.1-1, the staff requested that the applicant clarify whether all the system components such as, but not limited to, air cooling unit housings, dampers and damper housings, cooling coil housings, valve bodies, and screens for intake and exhaust structures are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In its response, by letter dated November 3, 2004, and supplemented by a letter dated December 3, 2004, the applicant stated that all applicable system components consisting of air cooling unit housings, dampers and damper housings, cooling coil housings, and valve bodies are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an AMR in accordance with 10 CFR 54.21(a)(1) for the RBVS (containment). LRA Section 2.3.5, "Notes Associated with the Section 2.3 Tables," is revised to reflect these component types and, therefore, is part of "Component Types" in LRA Table 2.3.2.1, "Containment System," and LRA Table 3.2.2.1, "Containment System-Summary of Aging Management Evaluation." The applicant also stated that the RBVS contains an intake plenum that contains louvers with screens and that these components perform no license renewal function; therefore, these components are not within the scope of license renewal.

Based on the review, the staff found the applicant's response to RAI 2.3.2.1-1 acceptable. The applicant clarified that all applicable system components consisting of air cooling unit housings, dampers and damper housings, cooling coil housings, and valve bodies are within the scope of license renewal, and subject to an AMR for the RBVS and are already included in "Component Types" in LRA Tables 2.3.2.1 and 3.2.2.1. Since the RBVS intake plenum with louvers and screens performs no license renewal function, these components are not within the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.2.1-1 is resolved.

### 2.3.2.1.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the containment system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the containment system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### 2.3.2.2 *Standby Gas Treatment System*

#### 2.3.2.2.1 Summary of Technical Information in the Application

In LRA Section 2.3.2.2, the applicant described the SGT system. The SGT system is shared between Units 1, 2, and 3. The SGT system consists of a suction duct system, three filter trains and blowers, and a discharge vent system. The common suction duct system takes suction from the normal ventilation exhaust duct of each of the three reactor zones and from the refueling zone that is independent of the normal ventilation system. Each filter train contains a moisture separator, a heater, a pre-filter, an upstream high efficiency particulate air (HEPA) filter, a charcoal filter, and a downstream HEPA filter. These three filter trains and blowers are arranged in parallel. The three blowers share a common discharge header that discharges to the plant stack 600 feet in elevation. The filter trains and blowers are located in the SGT building. The SGT system is normally in standby operation and will start automatically, when required.

The SGT system contains SR components that are relied upon to remain functional during, and following, DBEs. In addition, the SGT system performs functions that support EQ.

The intended functions within the scope of license renewal include the following:

- maintains negative pressure in the secondary containment on the primary containment system group six isolation signal
- filters airborne particulates and gases including those from the HPCI and CAD systems prior to discharge to the off-gas system
- maintains negative pressure in secondary containment on primary containment system signal due to radiation monitoring system refueling zone high radiation signal
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.2.2, the applicant identified the following SGT system component types that are within the scope of license renewal and subject to an AMR: bolting, ductwork, fittings, flexible connectors, piping, tubing, and valves.

#### 2.3.2.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.2 and LRA Appendix F and UFSAR Sections 5.3.3, 7.12.5, and F.7.18 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting the review, the staff reviewed the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.2.2, the staff identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. Therefore, by letter dated October 8, 2004, the staff issued an RAI concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's responses.

In RAI 2.3.2.2-1, the staff requested the applicant to clarify whether all the system's components such as, but not limited to, fan housings, filter housing, damper housing, valve bodies, screens for intake and exhaust structures, and all other applicable components of the system, including duct sealants, wall sealants, pressure boundary sealants are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In its response, by letter dated November 3, 2004, and supplemented by a letter dated December 3, 2004, the applicant stated that all applicable system components consisting of fan housings, filter housing, damper housing, valve bodies including duct sealants, wall sealants, and pressure boundary sealants are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an AMR in accordance with 10 CFR 54.21(a)(1) for the SGT system. The applicant also stated that structural sealants, such as those required to maintain the secondary containment at a negative pressure with respect to the adjacent areas, are contained in LRA Section 3.5.2.1.2 and Table 3.5.2.2 as component types "Compression Joints and Seals" and "Caulking and Sealants," and that the SGT system does not contain air intake/exhaust structures with screens (SGT system exhausts to the reinforced concrete chimney (plant stack) as addressed in LRA Section 2.4.6.1).

In LRA Section 2.3.5, "Notes Associated with the Section 2.3 Tables," "Component Types" are revised to reflect these components and, therefore, are part of LRA Table 2.3.2.2, "Standby Gas Treatment System" and LRA Table 3.2.2.2, "Standby Gas Treatment System-Summary of Aging Management Evaluation."

Based on its review, the staff found the applicant's response to RAI 2.3.2.2-1 acceptable. The applicant clarified that all applicable system components consisting of fan housings, filter housing, damper housing, valve bodies, and all other applicable components of the system, including duct sealants, wall sealants, and pressure boundary sealants are within the scope of

license renewal, and subject to an AMR for the SGT system and are already included in “Component Types” in LRA Tables 2.3.2.2 and 3.2.2.2. Therefore, the staff’s concern described in RAI 2.3.2.2-1 is resolved.

### 2.3.2.2.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the SGT system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the SGT system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.2.3 High Pressure Coolant Injection System**

#### 2.3.2.3.1 Summary of Technical Information in the Application

In LRA Section 2.3.2.3, the applicant described the HPCI system. The HPCI system, in conjunction with the other ECCSs, limits the peak fuel clad temperature, over the complete spectrum of possible break sizes in the RCPB, during design-basis accidents. The HPCI system also provides adequate core cooling for small breaks and depressurizes the reactor coolant systems to allow low-pressure coolant injection and core spray flow. In addition, the HPCI system provides reactor vessel make-up, pressure control, and decay heat removal during regulated events.

Each unit has an individual HPCI system and no components are shared; however, each unit’s HPCI pump may take suction from any unit’s condensate storage tank. The HPCI system consists of a single steam turbine-driven pump. The steam supply for the turbine comes from the MS system and exhausts to the suppression pool. The pump takes suction from the condensate storage tank, or the suppression pool, and discharges into the reactor vessel, through the feedwater (FW) system. A full-flow test line to the condensate storage tank is provided. During normal operation, the HPCI system is in standby. The HPCI system automatically starts if there is high pressure in the drywell or a low-water level in the reactor vessel.

The HPCI system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the HPCI system could prevent the satisfactory accomplishment of an SR function. In addition, the HPCI system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides an RCPB during HPCI system standby and operation
- provides a primary containment boundary during HPCI system standby and operation

- limits the loss of coolant through the HPCI system steam supply line break (passive, flow restrictor built into the steam line)
- provides a secondary containment boundary
- establishes a main steam safety isolation valve (MSIV) leakage pathway to the condenser
- provides coolant to the reactor vessel until it can be manually run in the condensate storage tank to condensate storage tank recirculation mode for pressure relief and decay heat
- provides debris protection
- provides for flow distribution
- restricts flow
- provides for heat transfer
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.2.3, the applicant identified the following HPCI system component types that are within the scope of license renewal and subject to an AMR: bolting, condenser, expansion joint, fittings, RCPB fittings, flexible connectors, gland seal blower, heat exchangers, piping, RCPB piping, pumps, restricting orifice, RCPB restricting orifice, strainers, tanks, traps, tubing, turbines, valves, and RCPB valves.

#### 2.3.2.3.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.3 and UFSAR Sections 5.2.3, 5.3, 6.3, 6.4.1, and 7.4 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.3.2.3.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the HPCI system components that are within the scope of license

renewal, as required by 10 CFR 54.4(a), and the HPCI system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.2.4 Residual Heat Removal System**

##### **2.3.2.4.1 Summary of Technical Information in the Application**

In LRA Section 2.3.2.4, the applicant described the RHR system. Each unit has two RHR system loops and each loop has two RHR pumps and two RHR heat exchangers. The pump suction header and the heat exchanger discharge header of one loop in Unit 1 and one loop in Unit 2 can be cross-connected. A similar cross-connection is provided between Unit 2 and Unit 3.

The RHR system provides a number of functions that are manually initiated. The RHR system provides shutdown cooling during normal operations and regulated events. The RHR system, in conjunction with the other ECCSs, also provides core flooding to limit the peak fuel clad temperatures over the complete spectrum of possible break sizes in the RCPB during design-basis accidents.

Provisions are provided within the RHR system, for both makeup and reject, to maintain the suppression pool level within the required limits. Cross-connections with the fuel pool cooling system allow the RHR heat exchangers to supplement heat removal and provide a permanent source of makeup water for the spent fuel pool.

The RHR contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the RHR could prevent the satisfactory accomplishment of an SR function. In addition, the RHR performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides suppression pool water cooling to maintain the suppression pool water temperature below limits to assure that pump net positive suction head requirements are met and that complete condensation of blowdown steam from a design-basis LOCA can be expected
- provides spray to drywell and torus for containment cooling and lowering of containment pressure under post-accident conditions
- provides a secondary containment boundary and a pressure boundary interface with the condensate ring header
- provides RCPB
- provides RHR system piping flow path for transmission of condensate and demineralized water system water supply to HPCI system piping upstream of HPCI system pump
- provides RHR system piping flow path from the HPCI system pump minimum flow coolant to the main RHR system heat exchangers

- provides debris protection
- provides for flow distribution
- restricts flow
- provides for heat transfer
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.2.4, the applicant identified the following RHR system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, RCPB fittings, heat exchangers, piping, RCPB piping, pumps, restricting orifice, strainers, tubing, valves, and RCPB valves.

#### 2.3.2.4.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.4 and UFSAR Sections 3.3, 4.1, 4.8, 5.2.3, 5.3, 6.4.4, 7.3, 7.4, 7.18, 9.2, 10.5, 10.9, 10.10, 10.17, F7.9, F7.15, and F7.16 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.3.2.4.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the RHR system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the RHR system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.2.5 Core Spray System**

#### 2.3.2.5.1 Summary of Technical Information in the Application

In LRA Section 2.3.2.5, the applicant described the CS system. The CS system, in conjunction with the other ECCSs, provides spray cooling to the reactor core to limit the peak fuel clad

temperature over the complete spectrum of possible break sizes in the RCPB during design-basis accidents. Each individual unit contains a separate CS system with two independent loops. Each loop has two pumps that can pump water from the suppression pool directed into the reactor vessel to the spray headers located above the core and within the core shroud. Some CS system components are located within the reactor vessel; these components are evaluated in the reactor vessel internals section of this SER.

Full-flow pump test capability is provided by discharge line to the suppression pool. During normal operation, the CS system is in standby and can be started automatically, when required. Full-flow suction lines from the condensate storage tanks penetrate the secondary containment and provide a suction flow path for the RCIC and HPCI systems.

The CS system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the CS system could prevent the satisfactory accomplishment of an SR function. In addition, the CS system performs functions that support EQ.

The intended functions within the scope of license renewal include the following:

- supplies cooling water to the reactor (automatic initiation)
- provides RCPB
- provides a primary containment boundary
- provides a secondary containment boundary and pressure boundary interface with the condensate system ring header
- provides debris protection
- restricts flow
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.2.5, the applicant identified the following CS system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, RCPB fittings, piping, RCPB piping, pumps, restricting orifice, RCPB restricting orifice, strainers, tanks, tubing, valves, and RCPB valves.

#### 2.3.2.5.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.5 and the UFSAR Sections 4.4, 5.2, 5.3, 6.4.3, 7.3, 7.4, 7.8, 10.10, and 11.7 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in the SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as

being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.2.5, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated October 8, 2004, the staff issued an RAI concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4 (a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 2.3.2.5-1, the staff stated that the low pressure coolant injection (LPCI) coupling was identified in the BWRVIP-06 report as an SR component. It appears, however, that the component was not identified in the LRA as requiring an AMR. Therefore, the staff requested the applicant to justify its exclusion from aging management and to submit an AMR for the subject component.

In its response, by letter dated November 3, 2004, the applicant stated that BFN does not contain a LPCI coupling; therefore this component was not identified in the LRA. Therefore, the staff's concern described in RAI 2.3.2.5-1 is resolved.

#### 2.3.2.5.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the CS system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the CS system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.2.6 Containment Inerting System**

#### 2.3.2.6.1 Summary of Technical Information in the Application

In LRA Section 2.3.2.6, the applicant described the containment inerting system. The containment inerting system provides the capability to measure oxygen and hydrogen concentrations in the primary containment following an accident. A separate oxygen and hydrogen monitoring system, with two sampling loops, is provided for each unit. The loops have pumps that pump the drywell or torus atmosphere past the hydrogen and oxygen sensors and back to the torus. In the event of an accident, the containment inerting system would be manually started.

The containment inerting system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the containment inerting system could prevent the satisfactory accomplishment of an SR function. In addition, the containment inerting system performs functions that support EQ.

The intended functions within the scope of license renewal include the following:

- provides oxygen and hydrogen gas analyzers and indicators to monitor gas concentrations inside the primary containment in support of CAD system operation,
- provides a primary containment boundary
- provides a secondary containment boundary
- provides debris protection
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.2.6, the applicant identified the following containment inerting system component types that are within the scope of license renewal and subject to an AMR: bolting, flexible connectors, heat exchangers, fittings, piping, pumps, strainers, traps, tubing, and valves.

#### 2.3.2.6.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.6, LRA Appendix F, and UFSAR Section 5.2.6 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting the review, the staff reviewed the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.2.6, the staff identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. Therefore, by the letter dated October 8, 2004, the staff issued an RAI concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's response.

In RAI 2.3.2.6-1, the staff requested that the applicant clarify whether the system components such as piping, valves, and equipment between FCV-76-17 and PC-V67-14, including the downstream bypass line after BYV-76-542, and between CKV-76-653 and CKV-76-659 depicted on LRA drawings 47E860-1-LR for Units 1, 2, and 3, are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In its response, by letter dated November 3, 2004, the applicant stated that all applicable system components between primary containment isolation valve FCV-76-17 and secondary

containment isolation valve PCV-76-14, and between primary containment isolation valve CKV-76-653 and secondary containment isolation valve CKV-76-659 are not within scope for 10 CFR 54.4(a)(1). They are not within scope for 10 CFR 54.4(a)(3) since they are not required for any of the regulated events. Also, since these components are not liquid filled, they do not meet the criteria of 10 CFR 54.4(a)(2).

Based on its review, the staff found the applicant's response to RAI 2.3.2.6-1 acceptable. The applicant clarified why the above system components are not within the scope of license renewal. The applicant identified those portions of the containment inerting system that meet the scoping requirements of 10 CFR 54.4 and included them within the scope of license renewal in LRA Section 2.3.2.6. The applicant also included containment inerting system components that are subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a) (1) in LRA Table 2.3.2.6, "Containment Inerting System," and in LRA Table 3.2.2.6, "Containment Inerting System-Summary of Aging Management Evaluation." Therefore, the staff's concern described in RAI 2.3.2.6-1 is resolved.

### 2.3.2.6.3 Conclusion

The staff reviewed the LRA, the accompany scoping boundary drawings, and the RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the containment inerting system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the containment inerting system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.2.7 Containment Atmosphere Dilution System**

#### 2.3.2.7.1 Summary of Technical Information in the Application

In LRA Section 2.3.2.7, the applicant described the CAD system. The CAD system is shared between Units 1, 2, and 3. The system consists of two trains, each of which is capable of supplying nitrogen through separate piping systems, to the drywell and suppression chamber. The system is in standby during normal operation and is started manually when required.

The CAD system contains SR components that are relied upon to remain functional during, and following, DBEs. In addition, the CAD system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides for dilution of the primary containment atmosphere with nitrogen after a LOCA to maintain hydrogen and oxygen gas concentrations below a level that could produce a combustible mixture (five percent oxygen by volume)
- provides a primary containment boundary

- provides a secondary containment boundary
- provides nitrogen as the actuating medium for the reactor building to torus vacuum breaker butterfly valves when control air is not available
- provides nitrogen makeup to the MSRVs
- provides for heat transfer
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.2.7, the applicant identified the following CAD system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, flex hose, heat exchangers, piping, tanks, tubing, and valves.

#### 2.3.2.7.2 Staff Evaluation

The staff reviewed LRA Section 2.3.2.7, LRA Appendix F, and UFSAR Sections 5.2.3 and 5.2.6 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting the review, the staff reviewed the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

On the basis of its review, the staff found that the applicant identified those portions of the CAD system that meet the scoping requirements of 10 CFR 54.4 and included them within the scope of license renewal in LRA Section 2.3.2.7. The applicant also included CAD system components that are subject to an AMR in accordance with 10 CFR 54.4(a) and 10 CFR 54.21(a)(1) in LRA Table 2.3.2.7, "Containment Atmosphere Dilution System," and in LRA Table 3.2.2.7, "Containment Atmosphere Dilution System-Summary of Aging Management Evaluation." LRA Section F.2, "Containment Atmosphere Dilution System Modifications," indicates that Unit 1 capability to supply pressurized nitrogen to operate the MSRVs when control air is not available will be identical to the capability of Units 2 and 3 and will result in the same AMPs for each unit. This item will be discussed in SER Section 2.6.1.2.

#### 2.3.2.7.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the CAD system components that are within the scope of license

renewal, as required by 10 CFR 54.4(a), and the CAD system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3 Auxiliary Systems**

In LRA Section 2.3.3, the applicant identified the systems and components of the auxiliary systems that are subject to an AMR for license renewal in the following sections of the LRA:

- 2.3.3.1 auxiliary boiler system
- 2.3.3.2 fuel oil system
- 2.3.3.3 residual heat removal service water system
- 2.3.3.4 raw cooling water system
- 2.3.3.5 raw service water system
- 2.3.3.6 high pressure fire protection system
- 2.3.3.7 potable water system
- 2.3.3.8 ventilation system
- 2.3.3.9 heating, ventilation, and air conditioning system
- 2.3.3.10 control air system
- 2.3.3.11 service air system
- 2.3.3.12 CO<sub>2</sub> system
- 2.3.3.13 station drainage system
- 2.3.3.14 sampling and water quality system
- 2.3.3.15 building heat system
- 2.3.3.16 raw water chemical treatment system
- 2.3.3.17 demineralizer backwash air system
- 2.3.3.18 standby liquid control system
- 2.3.3.19 off-gas system
- 2.3.3.20 emergency equipment cooling water system
- 2.3.3.21 RWCU system
- 2.3.3.22 reactor building closed cooling water system
- 2.3.3.23 reactor core isolation cooling system
- 2.3.3.24 auxiliary decay heat removal system
- 2.3.3.25 radioactive waste treatment system
- 2.3.3.26 fuel pool cooling and cleanup system
- 2.3.3.27 fuel handling and storage system
- 2.3.3.28 diesel generator system
- 2.3.3.29 control rod drive system
- 2.3.3.30 diesel generator starting air system
- 2.3.3.31 radiation monitoring system
- 2.3.3.32 neutron monitoring system
- 2.3.3.33 traversing in-core probe system
- 2.3.3.34 cranes system

The corresponding sub-sections of this SER (2.3.3.1 – 2.3.3.34) present the staff's review findings for each system of the auxiliary systems.

### **2.3.3.1 Auxiliary Boiler System**

#### **2.3.3.1.1 Summary of Technical Information in the Application**

In LRA Section 2.3.3.1, the applicant described the auxiliary boiler system. The auxiliary boiler system provides heating and miscellaneous steam services within the power house. This includes the ability to test the HPCI system and the RCIC system turbines while the reactor is shutdown. This system is a plant-shared system. The turbine building contains three oil-fired, auxiliary boilers.

The auxiliary boiler system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the auxiliary boiler system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides primary and secondary containment boundaries
- establishes an MSIV pathway to the condenser
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.1, the applicant identified the following auxiliary boiler system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, pipes, traps, tubing, and valves.

#### **2.3.3.1.2 Staff Evaluation**

The staff reviewed LRA Section 2.3.3.1 and UFSAR Sections 5.2, 5.3, and 10.20 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments that support secondary containment, the applicant expanded the system boundaries for the auxiliary boiler system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components outside of the secondary containment required to maintain the structural integrity of the secondary containment that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2). In the enclosure to the letter the applicant stated that piping

was added to scope. The component types do not differ from those listed in LRA Table 2.3.3.1; therefore, no changes to the auxiliary boiler system portion of the LRA are required.

The staff reviewed the NSR piping segments and found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.1.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the auxiliary boiler system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the auxiliary boiler system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.2 Fuel Oil System**

#### 2.3.3.2.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.2, the applicant described the fuel oil system. The fuel oil system is a plant-shared system; two large storage tanks are provided for the entire plant. Pumps transfer fuel oil to the auxiliary boilers and storage tanks for the various diesel-driven engines. The standby alternating current (AC) power fuel oil system consists of three interconnected storage tanks for each of the system's eight diesel generators (DGs). Transfer pumps are provided to transfer fuel from a 7-day storage tank to the associated DG day tank. These 7-day storage tanks can provide sufficient fuel for the operation of the DGs during seven continuous days, following a LOCA. The system is in standby during normal operation and starts automatically, when required, to supply fuel to any operating DG. The other plant DGs each have a single storage tank.

The fuel oil system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the fuel oil system could prevent the satisfactory accomplishment of an SR function. In addition, the fuel oil system performs functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides diesel fuel oil to the DG system
- maintains a 7-day (long term) supply of fuel oil in storage tanks to support the DG system
- provides debris protection
- restricts flow

- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.2, the applicant identified the following fuel oil system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, flex hose, piping, pumps, restricting orifice, stainers, tanks, tubing, and valves.

#### 2.3.3.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.2 and UFSAR Section 8.5.3.4 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.2, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued RAIs concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 2.3.3.2-1, the staff identified that components in the DG low level radioactive waste (LLRW) fuel oil subsystem and the diesel-driven fire pump LLRW fuel oil subsystem had not been included in the LRA as being within the scope of license renewal and subject to an AMR. The UFSAR does not describe either of these two subsystems. The staff is unable to determine if these subsystems have intended functions that would satisfy any of the criteria in 10 CFR 54.4(a). Therefore, the staff requested that the applicant provide the design functions and associated licensing bases of these portions of the fuel oil system to determine if they can be excluded from the scope of license renewal.

In its response, by letter dated October 19, 2004, the applicant stated that the two LLRW fuel oil subsystems provide fuel oil to the diesels to drive pumps that supply backup water to the ancillary facilities fire protection system. The areas protected by the ancillary facilities fire protection system are outside the protected area of the plant and are not required for plant shutdown.

Based on its review, the staff found the applicant's response to RAI 2.3.3.2-1 acceptable. The intended functions of these subsystems as described in the applicant's response are outside the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a). Therefore, the staff's concern described in RAI 2.3.3.2-1 is resolved.

In RAI 2.3.3.2-2, the staff identified that a drain valve and associated piping and fittings on the diesel fuel tank for the diesel-driven fire pump had not been included in the LRA as being within the scope of license renewal and subject to an AMR. Failure of this piping could affect the upstream valve and drain the storage tank. Therefore, the staff requested that the applicant justify the exclusion of the drain valve and associated piping and fittings from the scope of license renewal.

In its response, by letter dated October 19, 2004, the applicant stated that none of the piping shown on the license renewal drawing is SR or seismically qualified; the piping is within the scope of license renewal for fire protection. Failure of the short section of piping and fittings downstream of normally closed valve, 0-DRV-703, would not cause the storage tank to drain.

Based on its review, the staff found the applicant's response to RAI 2.3.3.2-2 acceptable. There is a normally closed valve within the scope of license renewal upstream of the drain valve in question; thus, failure of the short section of piping and fittings downstream of this valve would not affect the intended function of the storage tank. Therefore, the staff's concern described in RAI 2.3.3.2-2 is resolved.

#### 2.3.3.2.3 Conclusion

The staff reviewed the LRA and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the fuel oil system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the fuel oil system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.3 Residual Heat Removal Service Water System**

#### 2.3.3.3.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.3, the applicant described the RHRSW system. The RHRSW system is a plant-shared system. The system pumps water directly from Wheeler Reservoir through the RHR heat exchangers and EECW system components and discharges the water back into the Wheeler Reservoir.

The RHRSW system contains SR components that are relied upon to remain functional during, and following DBEs. The failure of NSR SSCs in the RHRSW could prevent the satisfactory accomplishment of an SR function. In addition, the RHRSW performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides cooling water to the RHR system heat exchangers
- provides cooling water to the EECW system upon start of the RHRSW pumps, given EECW valve position interlock signals

- provides a secondary containment boundary
- provides sump pump capability for RHRSW pump compartments
- provides debris protection
- restricts flow
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.3, the applicant identified the following RHRSW system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, piping, pumps, restricting orifice, strainers, tubing, and valves.

#### 2.3.3.3.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.3 and UFSAR Sections 4.8, 5.3, 7.12.4, 7.18, 10.9, 10.10, 11.6, F.7.7, F.7.15, and F.7.16 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.3, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's response.

In RAI 2.3.3.3-1, the staff stated that license renewal drawing 0-47E851-4-LR provides the drainage flow diagram (identified as system number 40 in the drawing title block). Most of the piping and valves for system 40 on the drawing are identified with UNIDs; however, the piping on this drawing is shown in red, but does not identify UNIDs for the piping or pumps. Therefore, the staff requested the applicant to identify which components on this drawing are part of the RHRSW system.

In its response, by letter dated October 19, 2004, the applicant stated that the piping and pumps shown in red on drawing 0-47E851-4-LR are associated with the pumping station and are part of the RHRSW system (system 23). The pumps are tagged as RHRSW system 23

components and there are no UNIDs assigned to pipe. These components are part of the RHRSW and are contained in LRA Table 2.3.3.3.

Based on its review, the staff found the applicant's response to RAI 2.3.3.3-1 acceptable. It confirms that the piping and pumps shown in red on the license renewal drawing are part of the residual heat removal service water system and that the components in question are appropriately included in LRA Table 2.3.3.3. Therefore, the staff's concern described in RAI 2.3.3.3-1 is resolved.

#### 2.3.3.3.3 Conclusion

The staff reviewed the LRA, the accompanying scoping boundary drawing, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the RHRSW system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the RHRSW system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.4 Raw Cooling Water System**

#### 2.3.3.4.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.4, the applicant described the raw cooling water (RCW) system. The RCW system cools plant components (including components in the reactor building) during normal operations. The Unit 1 and Unit 2 RCW systems share pump suction and discharge headers and seven RCW pumps. The separate, Unit 3 RCW system has five pumps that have a separate suction header, but share a common discharge header with Units 1 and 2. Three pumps per unit are normally required. The RCW system has interfaces with the EECW system, which is normally inservice. The RCW pumps are located in the turbine building and are supplied from the condenser circulating water system.

The RCW system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the RCW system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides a secondary containment boundary
- provides pressure boundary integrity for the EECW system
- provides a flow path through control room chillers A and B for Units 1 and 2 only
- restricts flow
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.4, the applicant identified the following RCW system component types that are within the scope of license renewal and subject to an AMR: bolting, expansion joint, fittings, flex hose, piping, pumps, strainers, tubing and valves.

#### 2.3.3.4.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.4 and UFSAR Sections 5.3, 10.7, and F.6.5 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.4, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's response.

In RAI 2.3.3.4-1, the staff identified that water chillers 1A and 1B on license renewal drawing 1-47E844-2-LR are not subject to an AMR, and heat exchangers are not listed as a component type in LRA Table 2.3.3.4. The shell of the chillers serves as the pressure boundary and structural support for the attached raw cooling water piping which is subject to an AMR. Therefore, the staff requested that the applicant justify the exclusion of these chillers from being subject to an AMR.

In its response, by letter dated October 19, 2004, the applicant stated that the piping on the shell side of water chillers 1A and 1B had been removed to show these chillers abandoned in place on drawing 1-47E844-1-LR. Since the raw water piping has been removed, the chillers no longer perform a pressure boundary or structural support function. The applicant further stated that the drawing has been revised and will be sent to the staff as part of the annual update.

Based on its review, the staff found the applicant's response to RAI 2.3.3.4-1 acceptable. Water chillers 1A and 1B no longer perform an intended function in accordance with the requirements of 10 CFR 54.4(a) and are outside the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.4-1 is resolved.

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments that support secondary containment, the applicant expanded the system boundaries for the raw cooling water system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components outside of the secondary containment required to maintain the structural integrity of the secondary containment that are within the scope of license renewal in accordance with

the requirements of 10 CFR 54.4(a)(2). In the enclosure to the letter the applicant stated that piping was added to scope. The component types do not differ from those listed in LRA Table 2.3.3.4; therefore, no changes to the raw cooling water system portion of the LRA are required.

The staff reviewed the NSR piping segments and found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.4.3 Conclusion

The staff reviewed the LRA and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the RCW system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the RCW system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.5 Raw Service Water System**

#### 2.3.3.5.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.5, the applicant described the raw service water (RSW) system. The RSW system furnishes water for yard-watering and the cooling of miscellaneous plant equipment that requires only small quantities of cooling water. The system also functions as a 'keep-fill' system for the fire protection system. The RSW system is supplied from river water from the condenser circulating water inlet conduit, through a strainer, and to the main RCW pump suction header for each unit. Units 1 and 2 each have one RSW pump; Unit 3 has two RSW pumps. Therefore, four pumps supply the common plant system. Two 10,000-gallon storage tanks are located on top of the reactor building. These tanks pressurize the high pressure fire protection (HPFP) system header.

The RSW system contains SR components that are relied upon to remain functional during, and following, DBEs. In addition, the RSW system performs functions that support fire protection.

The intended functions within the scope of license renewal include the following:

- provides a secondary containment boundary
- provides a keep-fill system for the fire protection system
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.5, the applicant identified the following RSW system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, piping, tanks, tubing, and valves.

#### 2.3.3.5.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.5 and UFSAR Sections 5.3, 10.8, 10.10, and F.6.6 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.5, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's related response.

In RAI 2.3.3.5-1, the staff identified that the raw service water components upstream of valve 1-25-703 are not included in the LRA as being within the scope of license renewal and subject to an AMR. Similar arrangements exist for Units 2 and 3. This normally open, hand-operated valve is located at the interface between the discharge of RSW pump 1A and the fire service system. Therefore, the staff requested that the applicant provide the basis for using a normally open, hand-operated valve as a pressure boundary from the upstream RSW system piping and components. The staff also requested that the applicant justify the exclusion of these components from the scope of license renewal.

In its response, by letter dated October 19, 2004, the applicant stated that the fire protection capability to control and extinguish fires is not dependent on the operability of the raw service water pumps. Therefore, these pumps are not in scope, and any piping and valves associated with the RSW system are also not included within the scope of license renewal. Additionally, the applicant stated that valve 1-25-703 is the first isolation valve off the 12-inch fire protection headers tie-in to the RSW pumps, and is within the scope of license renewal as it provides an isolable point between the RSW and fire protection systems.

Based on its review, the staff found the applicant's response to RAI 2.3.3.5-1 acceptable. The RSW pumps and associated components do not perform an intended function in accordance with the requirements of 10 CFR 54.4(a), and are, therefore, outside the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.5-1 is resolved.

#### 2.3.3.5.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the RSW system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the RSW system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.3.6 High Pressure Fire Protection System**

##### 2.3.3.6.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.6, the applicant described the HPFP system. The HPFP system supplies water for fixed water spray, pre-action sprinkler, and aqueous foam systems for selected equipment and areas in the control building, reactor buildings, turbine building, intake pumping station, hydrogen trailer port, transformer yard, DG buildings, and service buildings.

The HPFP system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the HPFP system could prevent the satisfactory accomplishment of an SR function. In addition, the HPFP system performs functions that support fire protection.

The intended functions within the scope of license renewal include the following:

- supports a secondary containment function
- provides automatic fire protection for known hazardous areas where it is practical
- provides adequate warning of a fire in hazardous areas where automatic protection is not feasible to provide adequate manually-actuated fire protection systems for the entire plant and yard areas (i.e., hose stations, hydrants, etc.)
- ensures the maintenance of divisional integrity of SR systems to the extent that the capability for safe shutdown of the reactors is assured during and after a fire
- provides debris protection
- provides mechanical closure
- provides pressure boundary
- provides spray pattern
- provides structural support

In LRA Table 2.3.3.6, the applicant identified the following HPFP system component types that are within the scope of license renewal and subject to an AMR: bolting, fan housing, fire hydrants, fire hose stations, fittings, flexible connectors, heaters, heat exchangers, piping, pumps, restricting orifice, silencer, sprinkler heads, strainers, tanks, tubing, and valves.

#### 2.3.3.6.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.6 and UFSAR Sections 10.11 and F.6.9 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). In addition, the staff also reviewed the BFN Fire Protection Report (FPR) (Volumes 1 and 2). This report is referenced directly in the BFN fire protection CLB and summarizes the fire protection program and commitments to 10 CFR 50.48 using the guidance of Appendix A to Branch Technical Position (BTP) Auxiliary and Power Conversion Systems Branch (APCSB) 9.5-1. The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.6, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 23, 2004, the staff issued RAIs concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses and staff evaluation.

In RAI 2.3.3.6-1, the staff stated that the system description of the HPFP system in LRA Section 2.3.3.6 includes fixed water spray systems. Such systems typically utilize water spray nozzles. The staff identified that LRA Table 2.3.3.6 does not include water spray nozzles as a component subject to an AMR. Therefore, the staff requested that the applicant indicate whether the fixed water spray systems use spray nozzles other than the sprinkler heads. If so, staff stated that the nozzles, which are intended to support the system function, are passive and long-lived and should be subject to an AMR.

In its response, by letter dated September 30, 2004, the applicant stated that fire protection spray nozzles (including spray nozzles attached to fire hoses) had been included in component type "sprinkler heads" in LRA Table 2.3.3.6.

Based on its review, the staff found the applicant's response to RAI 2.3.3.6-1 acceptable. The components in question are included in scope and are subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.6-1 is resolved.

In RAI 2.3.3.6-2, the staff stated that the system description of the HPFP system in LRA Section 2.3.3.6 describes detection and alarm devices that automatically initiate the system or prompt manual fire fighting. The staff stated that these devices are not identified on the license renewal drawings, nor are they discussed in the fire protection program. Therefore, the staff requested that the applicant explain what these devices are and whether they are subject to an AMR.

In its response, by letter dated September 30, 2004, the applicant stated that the alarm and detection devices do not perform a pressure boundary function, are active components, and are evaluated as electrical commodities.

Based on its review, the staff found the applicant's response to RAI 2.3.3.6-2 acceptable. The components in question are electrical, not mechanical, and are active, and therefore are not subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.6-2 is resolved.

In RAI 2.3.3.6-3, the staff stated that the LRA shows that the boundary of the HPFP system is the service building wall. The staff stated that the boundary shown is not at an isolated pressure boundary (e.g., a valve or blank flange). Therefore, the staff requested that the applicant justify the exclusion of the service building portions of the system from the scope of license renewal.

In its response, by letter dated September 30, 2004, the applicant stated that the boundary does not end at the service building wall but continues on license renewal drawing 1-47E850-2-LR. BFN drawings depict continuation to other drawings with drawing coordinate flags. For clarification, the reference to drawing coordinate flag 1-47E850-2 G6 should have been colored red on license renewal drawing 1-47E850-1-LR. The boundary should end at the isolation valve 0-26-907 on drawing 1-47E850-2-LR. The boundary extends to an appropriate isolation valve.

Based on its review, the staff found the applicant's response to RAI 2.3.3.6-3 acceptable. The boundary extends to an appropriate isolation valve. Therefore, the staff's concern described in RAI 2.3.3.6-3 is resolved.

In RAI 2.3.3.6-4, the staff stated that the LRA identifies a water curtain around the equipment hatch at elevation 565 feet. Table 9.3.11.B in Volume 1 of the FPR lists water curtains for the RHR pump room equipment hatches at elevation 541 feet. The staff identified that the license renewal drawings do not show anything on elevation 541 feet. Therefore, the staff requested that the applicant clarify that the water curtain protection for the RHR pump room equipment hatches are within the scope of license renewal, and identify where they are located on the license renewal drawings.

In its response, by letter, dated September 30, 2004, the applicant stated that the water curtains at BFN are typically provided to protect floor openings and include closely spaced sprinklers and draft stops located around the opening underneath the floor slab. In Unit 3 reactor building elevation 565 feet, as shown on license renewal drawing 3-47E850-5, water curtains are provided at the following six different locations:

- (1) equipment hatch in floor opening above (between floor elevation 565 feet and 593 feet)
- (2) stair #22 floor opening above (between floor elevation 565 feet and 593 feet)
- (3) east RHRSW heat exchanger (HX) room portal (door opening)
- (4) west RHRSW HX room portal (door opening)
- (5) east RHRSW HX room floor opening below (between elevation 541 feet and 565 feet)
- (6) west RHRSW HX room floor opening below (between elevation 541 feet and 565 feet)

The water curtains (5 and 6) in the RHRSW HX room floor opening are located below elevation 565 feet floor slab to protect the opening from the fire effects of elevation 541 feet. These two water curtains are the ones described in Table 9.3.11.B, Volume 1 of the FPR as the water curtains for the RHR pump room equipment hatches at elevation 541 feet. These water curtains are within the scope of license renewal.

Based on its review, the staff found the applicant's response to RAI 2.3.3.6-4 acceptable. The water curtains in question were verified by the applicant to be within the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.6-4 is resolved.

In reviewing the FPR, the staff identified the need for additional information related to the fire water supply systems and fire protection coating. In a letter dated August 23, 2004, the staff asked the applicant to clarify information contained in the FPR Volume 1, Sections 4.4.1.A and 4.4.5. The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 4.4.1-1, the staff stated that FPR Section 4.4.1.A addresses a separate water supply system, including tank and pumps, which does not appear in the LRA or boundary drawings. In RAI 4.4.1-1, the staff requested the applicant to verify whether these system components are within the scope of license renewal and provide the justification if they are not.

In its response, by letter dated September 30, 2004, the applicant stated that the separate water supply ID referring to the outside loop is not within the scope of license renewal, since it is servicing NSR areas of the plant that provide equipment/property protection and meet the Nuclear Electric Insurance Limited (NEIL) requirements. Therefore, they do not meet any criteria of 10 CFR 54.4.

Based on its review, the staff found the applicant's response to RAI 4.4.1-1 acceptable. Even though the separate water supply can be connected to the HPFP system as a backup identified in plant procedures, it is not connected by fixed piping and valves. Therefore, the staff concurred that the separate water supply is not within the scope of license renewal, and the staff concern described in RAI 4.4.1-1 is resolved.

In RAI 4.4.5-1, the staff stated that FPR Section 4.4.5 states that "Flamemastic" was applied to cables that did not meet Institute of Electrical and Electronics Engineers (IEEE)-383 flame test requirements. Inspection Testing and Maintenance of this is not referenced in the FPR. No reference is made to it in the LRA, either under the Fire Protection Program, LRA Section B.2.1.23, or in the electrical or structural programs. Therefore, the staff requested that the applicant supply the AMR and AMP that are applicable to the Flamemastic coating. The staff also asked the applicant to include program documents and procedures credited for managing the loss of material for Flamemastic coating.

In its response, by letter dated September 30, 2004, the applicant stated that Flamemastic is primarily used as a flame retardant on non-IEEE-383 qualified cables. This commitment originated as part of the post-Fire Recovery Plan. As stated in the FPR, current practice is to use cables that meet the IEEE-383 requirements for flame retardant and, therefore, Flamemastic is not applied to these cables. Since Flamemastic is not considered a fire stop or a fire-resistive barrier, the 10 CFR Part 50, Appendix R, safe-shutdown analysis does not take credit for it. Some cable tray penetration seal assemblies, however, use a coating of Flamemastic on the fiber board and cables around the opening to meet the fire barrier function.

Materials listed in LRA Sections 3.5.2.1.2 and 3.5.2.1.5 should include Flamemastic coatings, when used in a qualified fire barrier configuration, to include both sides of the reactor building/turbine building wall cable tray penetrations.

By letter dated January 25, 2005, applicant stated that the aging effects requiring management were incorrectly assigned to Flamemastic when used in the qualified fire barrier configuration. At BFN, fire barrier penetration seal materials and Flamemastic coatings on exposed cables in open trays are exposed to an inside air environment and, therefore, have no aging effects and require no AMP.

The applicant further stated that, based on the above discussion, aging effects were also incorrectly assigned to fire barrier materials Thermolag, Elastomers, and Gypsum. LRA Section 3.5 will be revised to update the aging effects requiring management for these fire barrier materials.

Based on review of the applicant's response, as supplemented by letter dated January 25, 2005, the staff concurred that the proposed modifications to the LRA are appropriate, because Flamemastic coating on exposed cable trays are exposed to an inside air environment and require no AMR and AMP but are included within the scope of license renewal. Therefore, the staff's concern described in RAI 4.4.5-1 is resolved.

In addition, the staff, during its audit review held during the week of July 21 - 25, 2004, discussed the following issue for the Fire Protection Program.

In its letter, dated October 28, 2004, the applicant stated that Procedure FP-0-041-INS008, Process Computer Room Halon 1301 System Functional Test, identifies a Halon 1301 total flooding system on elevation 539 feet of the Control Bay (room 594.0-C1). No reference to Halon systems appears in the LRA (scoping, screening, AMR or AMP.) The applicant was requested to justify the exclusion of this system from license renewal.

The applicant also stated in its response that the Halon system does not provide fire protection for any equipment for plant shutdown but is installed to provide equipment/property protection and meet NEIL requirements. Therefore, this system does not meet any of the criteria of 10 CFR 54.4. Based upon its review, the staff agreed that the Halon 1301 systems identified in FP-0-041-INS008 are not part of the plant licensing basis and, therefore, are not within the scope of license renewal. The staff concern described above is resolved.

#### 2.3.3.6.3 Conclusion

The staff reviewed the LRA and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the HPFP system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the HPFP system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.7 Potable Water System**

#### **2.3.3.7.1 Summary of Technical Information in the Application**

In LRA Section 2.3.3.7, the applicant described the potable water system. The potable water system supplies potable water for use in the plumbing systems and is supplied by the city of Athens, AL. Potable water is supplied to various areas in the plant. Backflow preventers are installed at each interface between the potable water system and the separate connecting systems, in order to protect the potable water supply from possible contamination due to backflow. The potable water system is a plant-shared system.

The potable water system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the potable water system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides a secondary containment boundary
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.7, the applicant identified the following potable water system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, piping, tubing, and valves.

#### **2.3.3.7.2 Staff Evaluation**

The staff reviewed LRA Section 2.3.3.7 and UFSAR Sections 5.3, 10.15, and F.6.11 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments that support secondary containment, the applicant expanded the system boundaries for the potable water system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components outside of the secondary containment required to maintain the structural integrity of the secondary containment that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2). In the enclosure to the letter the applicant stated that new

component types, valves and tanks, were added to the scope as referenced in new LRA Tables 2.3.3.7 and 3.3.2.7.

The staff reviewed the NSR piping segments and found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.7.3 Conclusion

The staff reviewed the LRA and RAI response to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the potable water system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the potable water system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.8 Ventilation System**

#### 2.3.3.8.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.8, the applicant described the ventilation system. The ventilation system contains subsystems that provide ventilation and heating for various plant buildings, including the radioactive waste building and the DG buildings. The ventilation system does not include the HVAC systems or the reactor building ventilation systems. These systems are discussed in SER Section 2.3.3.9. The ventilation system is a plant-shared system.

The radioactive waste building ventilation system consists of two 50-percent capacity supply fans that filter air to central areas on the various plant floor levels. The ventilation systems for the DG buildings are designed to maintain the required environmental conditions for SR equipment located in the Unit 1, 2, and 3 DG buildings.

The ventilation system contains SR components that are relied upon to remain functional during, and following, DBEs. In addition, the ventilation system performs functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides ventilation to the Unit 1, 2, and 3 DG buildings
- provides ventilation to the 250 volt (V) Battery Room 3EB in the Unit 3 DG building to prevent the buildup of hydrogen gas during battery charging
- provides for secondary containment integrity (passive)
- provides debris protection
- provides fire barrier

- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.8, the applicant identified the following ventilation system component types that are within the scope of license renewal and subject to an AMR: bolting, ductwork, fire dampers, and fittings.

#### 2.3.3.8.2 Staff Evaluation

The staff reviewed LRA Sections 2.3.3.8 and BFN Units 1, 2, and 3 UFSAR Sections 5.3 and 10.12, and F.7.11 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting the review, the staff reviewed the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.8, the staff identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. Therefore, by the letter dated October 8, 2004, the staff issued an RAI concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's related responses.

In RAI 2.3.3.8-1, the staff requested that the applicant clarify whether all the system components such as, but not limited to, damper housings including fire damper housings, fan housings, air intake and exhaust structures including screens, supply and exhaust grills, etc., are within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In its response, by letter dated November 3, 2004, and supplemented by a letter dated December 3, 2004, the applicant stated that (1) the damper housings and fan housings are included in component type "ductwork" in LRA Table 2.3.3.8, (2) fire damper housings are included in component type "fire dampers" in LRA Table 2.3.3.8, (3) screens associated with the exhaust plenum in the Units 1 & 2 DG building and the Unit 3 DG building are included in component type "ductwork" in LRA Table 2.3.3.8, and (4) intake/exhaust plenums associated with the DG buildings are considered part of the structure and are contained in LRA Table 2.4.3.1 and LRA Table 3.5.2.5. LRA Section 2.3.5, "Notes Associated with the Section 2.3 Tables," "Component Types" are revised to reflect these components and, therefore, are part of LRA Table 2.3.3.8, "ventilation system" and LRA Table 3.3.2.8, "Ventilation System-Summary of Aging Management Evaluation."

Based on its review, the staff found the applicant's response to RAI 2.3.3.8-1 acceptable. The applicant clarified that all applicable system components consisting of damper housings including fire damper housings, fan housings, air intake and exhaust structures including screens and all other applicable components of the system are within the scope of license renewal, and subject to an AMR for the ventilation system. Supply and exhaust grills do not perform any SR function, therefore, are excluded from the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.8-1 for those "Component Types" in LRA Tables 2.3.3.8 and 3.3.2.8 is resolved.

#### 2.3.3.8.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the ventilation system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the ventilation system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.9 Heating, Ventilation, and Air Conditioning System**

#### 2.3.3.9.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.9, the applicant described the HVAC system. The HVAC subsystems provide air-conditioned ventilation for various plant areas. The various HVAC subsystems provide environmental control, ventilation, and cooling. Ventilation and cooling is provided so that the temperatures of the control bay and shutdown electrical board rooms (including those in the Unit 3 DG building) are maintained within acceptable limits for the operation of instruments and other equipment during accidents and events. Ventilation is also provided to the battery room to prevent the buildup of explosive gases. In addition, the HVAC subsystems provide for the cooling of various electrical equipment rooms (e.g., computer and communications rooms) so that their temperatures are maintained within acceptable limits for the operation of instruments and other equipment.

The HVAC system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the HVAC system could prevent the satisfactory accomplishment of an SR function. In addition, the HVAC system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- isolates supply ducts and supplies pressurized filtered outdoor air to main control room on primary containment isolation system group six signal or radiation monitoring system initiation signal
- provides ventilation to cable spreading rooms and control bay mechanical equipment rooms

- recirculates cool air to the reactor building board rooms
- provides ventilation and air conditioning to the board rooms of the Unit 3 DG buildings and ventilation to the battery rooms
- provides recirculation air conditioning to control rooms and auxiliary instrument rooms
- provides manual lineup of HVAC equipment with total loss of control air
- provides a secondary containment boundary
- provides debris protection
- provides fire barrier
- provides for heat transfer
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.9, the applicant identified the following HVAC system component types that are within the scope of license renewal and subject to an AMR: bolting, ductwork, fire dampers, fittings, flexible connectors, heat exchangers, heaters, piping, pumps, refrigerant compressor, strainers, tanks, tubing, and valves.

#### 2.3.3.9.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.9 and UFSAR Sections 10.12 and F.7.11 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting the review, the staff reviewed the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.9, the staff identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. Therefore, by the letter dated October 8, 2004, the staff issued an RAI concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's related responses.

In RAI 2.3.3.9-1, the staff requested that the applicant clarify whether all the system components such as, but not limited to, fan housings, filter housings, cooling coil housings, damper housings including fire damper housings, metal lath screens, valve bodies, supply and return grills, and all other applicable components of the system, including duct sealants, wall sealants, pressure boundary sealants, screens for intake and exhaust structures, etc., are

within the scope of license renewal in accordance with 10 CFR 54.4(a), and subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In its response, by letter dated November 3, 2004, and supplemented by a letter dated December 3, 2004, the applicant stated the following:

- Fan housings, filter housings, cooling coil housings, and damper housings are included in component type “ductwork” in LRA Table 2.3.3.9.
- Metal lath screens shown on drawings 0-47E865-8-LR and 3-47E865-8-LR are included in component type “ductwork” in LRA Table 2.3.3.8.
- Screens and plenums will be included in the component type “ductwork.”
- LRA Table 3.3.2.9 will be revised to include “outside air (external)” for “ductwork.” A new row will be added for stainless steel “bolting” category with an outside air environment.
- Valve bodies are included in component type “valves” in LRA Table 2.3.3.9.
- Structural sealants such as those required to maintain the control room envelope or secondary containment are contained in Section 3.5.2.1.2 and in component type “compression joints and seals” and in component type “caulking and sealants” in LRA Table 3.5.2.2,
- Pressure boundary sealants associated with ductwork for HVAC system are included in component type “ductwork” in LRA Tables 2.3.3.9 and 3.3.2.9, and screens and plenums are included in the component type “ductwork.”

The supply and return grilles have no 10 CFR 54.4(a)1, 10 CFR 54.4(a)2, or 10 CFR 54.4(a)3 functions for license renewal and are not included in the LRA Tables. LRA Section 2.3.5, “Notes Associated with the LRA Section 2.3 tables,” “Component Types” is revised to reflect these components and, therefore, is part of LRA Table 2.3.3.9, “Heating, Ventilation, and Air Conditioning System,” and LRA Table 3.3.2.9, “Heating, Ventilation, and Air Conditioning System-Summary of Aging Management Evaluation.”

Based on its review, the staff found the applicant’s response to RAI 2.3.3.9-1 acceptable. The applicant clarified that all applicable system components consisting of fan housings, filter housings, cooling coil housings, damper housings, metal lath screens, screens and plenums, valve bodies, structural sealants to maintain the control room envelope including compression joints and seals, and pressure boundary sealants associated with ductwork are within the scope of license renewal, and subject to an AMR for the HVACS and are already included in “Component Types” in LRA Tables 2.3.3.9 and 3.3.2.9. Therefore, the staff’s concern described in RAI 2.3.3.9-1 is resolved.

#### 2.3.3.9.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the HVAC system

components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the HVAC system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.10 Control Air System**

#### **2.3.3.10.1 Summary of Technical Information in the Application**

In LRA Section 2.3.3.10, the applicant described the control air system. The control air system provides motive power for numerous plant components during normal operations and post-accident motive power to the torus vacuum breaker valves. The system also provides post-accident motive power to the MS isolation valves and the main steam safety relief valves (MSRVs) for reactor vessel overpressure relief protection and reactor vessel depressurization, including the ECCS automatic depressurization function.

The control air system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the control air system could prevent the satisfactory accomplishment of an SR function. In addition, the control air system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- performs isolation action(s) upon receiving primary containment system (64D) group six isolation signals
- provides compressed air to the MS system atmospheric dilution system (ADS) safety relief valves
- provides compressed air for closure of the MSIVs
- provide primary containment boundary
- provides compressed air to equipment access air lock seals to provide a secondary containment boundary
- provides and supports the secondary containment boundary
- provides for flow path integrity for supply of CAD nitrogen to the torus vacuum breaker valves
- provides a flow path for the CAD system to provide nitrogen to MSRVs
- provides for flow distribution
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.10, the applicant identified the following control air system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, flexible connectors, heat exchangers, piping, restricting orifice, tanks, tubing, and valves.

#### 2.3.3.10.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.10 and UFSAR Sections 5.2.3, 5.3, 10.14, and F.6.3 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.3.3.10.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the control air system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the control air system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.11 Service Air System**

#### 2.3.3.11.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.11, the applicant described the service air system. The service air system is a plant-shared system and consists of two air compressors that are located in the turbine building. The system's primary function is to provide pressurized air to hose connections throughout the plant yard and to miscellaneous equipment in the standby liquid control (SLC) system, Amertap condenser tube cleaning system (a subsystem of the condenser circulating water system), condensate demineralizer air surge system, and the radwaste system.

The service air system contains SR components that are relied upon to remain functional during, and following, DBEs.

The intended functions within the scope of license renewal include the following:

- provides primary and secondary containment boundaries
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.11, the applicant identified the following service air system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, piping, and valves.

#### 2.3.3.11.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.11 and UFSAR Sections 5.2.3, 5.3, 10.14, and F.6.3 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments that support secondary containment, the applicant expanded the system boundaries for the service air system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components outside of the secondary containment required to maintain the structural integrity of the secondary containment that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2). In the enclosure to the letter the applicant stated that piping, fittings, and valves were added to scope. The component types do not differ from those listed in LRA Table 2.3.3.11; therefore, no changes to the service air system portion of the LRA are required.

The staff reviewed the NSR piping segments and found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.11.3 Conclusion

The staff reviewed the LRA and RAI response to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the service air system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the service air system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.12 CO<sub>2</sub> System**

#### **2.3.3.12.1 Summary of Technical Information in the Application**

In LRA Section 2.3.3.12, the applicant described the CO<sub>2</sub> system. The CO<sub>2</sub> system is a fire suppression system for the DG buildings, turbine building, and control bay spaces that contain electrical, lubricating oil, or fuel oil components. Units 1 and 2 share a system that includes a 17-ton storage tank. Unit 3 has a separate system with a 6-ton tank. The system is in standby during normal operation and initiates automatically, as required. When initiated, ventilation systems that could reduce the effectiveness of the CO<sub>2</sub> discharge are isolated. Detection and alarm devices that automatically initiate the system, or would prompt manual fire firefighting activities, are also included in the CO<sub>2</sub> system. The CO<sub>2</sub> system performs functions that support fire protection.

The intended functions within the scope of license renewal include the following:

- provides CO<sub>2</sub> fire protection for oil and electrical hazards affecting the minimum safe shutdown system (SSDS) components required to achieve safe shutdown capability
- provides fire barrier
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.12, the applicant identified the following CO<sub>2</sub> system component types that are within the scope of license renewal and subject to an AMR: bolting, ductwork, fire dampers, fittings, piping, rupture disk, tanks, tubing, and valves.

#### **2.3.3.12.2 Staff Evaluation**

The staff reviewed LRA Section 2.3.3.12 and UFSAR Sections 10.11 and F.6.9 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). In addition, the staff also reviewed BFN FPR volumes 1 and 2. This report is referenced directly in the fire protection CLB and summarizes the Fire Protection Program and commitments to 10 CFR 50.48 using the guidance of Appendix A to BTP APCS 9.5-1. The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.12, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results.

Therefore, by letter to the applicant dated August 23, 2004, the staff issued RAIs concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 2.3.3.12-1, the staff stated that the CO<sub>2</sub> system addressed in LRA Section 2.3.3.12 typically requires discharge nozzles to achieve the proper flow rate. The staff identified that the system description and LRA Table 2.3.3.12 do not include any reference to discharge nozzles. Therefore, the staff requested the applicant to indicate whether this system includes discharge nozzles. If so, the staff stated that the nozzles, which perform an intended function for flow control, are passive and long lived and should be subject to an AMR.

In its response, by letter dated September 30, 2004, the applicant stated that the discharge nozzles were included within component type "fittings" in Table 2.3.3.12 with an intended function of pressure boundary and subject to an AMR.

Based on the response, the staff concurred that the nozzles are within the scope of license renewal and subject to an AMR, but disagreed that the intended function is pressure boundary. The nozzles contain open orifices and serve a flow control function rather than a pressure boundary. The staff reviewed plant procedures 0-SI-4.11.D.1.b, 1/2-SI-4.11.D.1.b, and 3-SI-4.11.D.1.b for CO<sub>2</sub> system functional testing and found the nozzles are adequately addressed in the fire protection AMP. Therefore, the staff concern described in RAI 2.3.3.12-1 is resolved.

In RAI 2.3.3.12-2, the staff stated that the system description of the CO<sub>2</sub> system in LRA Section 2.3.3.12 addresses detection and alarm devices that automatically initiate the system or prompt manual fire fighting. The staff stated that these devices are not identified on the license renewal drawings, nor are they discussed in the Fire Protection Program. Therefore, the staff requested that the applicant explain what these devices are and whether they are subject to an AMR.

In its response, by letter dated September 30, 2004, the applicant stated that the CO<sub>2</sub> system fire protection detection and alarm devices do not form a pressure boundary and are active components and evaluated as electrical commodities.

Based on its review, the staff found the applicant's response to RAI 2.3.3.12-2 acceptable. The components in question are electrical, not mechanical, and are therefore active and not subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.12-2 is resolved.

#### 2.3.3.12.3 Conclusion

The staff reviewed the LRA and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the CO<sub>2</sub> system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the CO<sub>2</sub> system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.13 Station Drainage System**

#### **2.3.3.13.1 Summary of Technical Information in the Application**

In LRA Section 2.3.3.13, the applicant described the station drainage system. The station drainage system is a plant-shared system that collects, processes, stores, and disposes of non-radioactive liquid waste. Portions of the piping within the system penetrate the secondary containment.

The station drainage system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the station drainage system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides a secondary containment boundary
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.13, the applicant identified the following station drainage system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, piping, and valves.

#### **2.3.3.13.2 Staff Evaluation**

The staff reviewed LRA Section 2.3.3.13 and UFSAR Sections 5.3 and 10.16 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.13, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's related response.

In RAI 2.3.3.13-1, the staff identified a 3-inch roof drain (at roof elevation 667 feet on license renewal drawing 0-47E851-1-LR,) that is not within the scope of license renewal and subject to an AMR. This drain provides a pressure boundary function between the standby gas treatment

system and the off-gas system; thus it should be within the scope of license renewal. The staff noted that a 4-inch roof drain on the same drawing is shown as being subject to an AMR. Therefore, the staff requested that the applicant justify the exclusion of the 3-inch roof drain from the scope of license renewal and from being subject to an AMR.

In its response, by letter dated October 19, 2004, the applicant stated that the 3-inch roof drain should have been colored in red on drawing 0-47E851-1-LR, since it is within the scope of license renewal as part of the component type "fittings" in LRA Table 2.3.3.13 and subject to an AMR. The applicant further stated that drawing 0-47E851-1-LR has been revised to show the 3-inch roof drain highlighted in red and will be resent as part of the annual update.

Based on its review, the staff found the applicant's response to RAI 2.3.3.13-1 acceptable. It concurs that the 3-inch roof drain should be within the scope of license renewal and the drain included in LRA Table 2.3.3.13 as a component type subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.13-1 is resolved.

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments that support secondary containment, the applicant expanded the system boundaries for the station drainage system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components outside of the secondary containment required to maintain the structural integrity of the secondary containment that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2). In the enclosure to the letter the applicant stated that piping, fittings, and check valves were added to scope. The component types do not differ from those listed in LRA Table 2.3.3.13; therefore, no changes to the station drainage system portion of the LRA are required.

The staff reviewed the NSR piping segments and found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.13.3 Conclusion

The staff reviewed the LRA, the accompanying scoping boundary drawing, and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the station drainage system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the station drainage system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.14 Sampling and Water Quality System**

#### **2.3.3.14.1 Summary of Technical Information in the Application**

In LRA Section 2.3.3.14, the applicant described the sampling and water quality system. The sampling and water quality system provides the capability to obtain representative samples for testing. The data are used to evaluate the performance of the plant, equipment, and systems during normal plant operations. Using a post-accident sample subsystem, representative samples of reactor coolant, torus liquid, drywell atmosphere, torus atmosphere, and secondary containment atmosphere can be obtained after a LOCA to guide post-LOCA actions regarding Units 2 and 3. Portions of the system are credited in analyses for MSIV alternate leakage treatment.

The sampling and water quality system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the sampling and water quality system could prevent the satisfactory accomplishment of an SR function. In addition, the sampling and water quality system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides RCPB
- provides primary and secondary containment boundaries
- maintains residual heat removal service water system pressure boundary integrity
- provides a pressure boundary of the sampling and water quality system components connected to the control air system that must maintain a pressure boundary in order to supply the CAD and MSRVs
- establishes MSIV leakage pathway to the condenser
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.14, the applicant identified the following sampling and water quality system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, RCPB fittings, flexible connectors, heat exchangers, piping, RCPB piping, pumps, strainers, tanks, tubing, valves, and RCPB valves.

#### **2.3.3.14.2 Staff Evaluation**

The staff reviewed LRA Section 2.3.3.14 and UFSAR Sections 5.2.3, 5.3, 10.17, and 10.21 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had

not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.14, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated October 8, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's related response.

In RAI F 2.3.3.14-1, the staff stated that LRA Section 2.3.3.14 states that one of the intended functions of the sampling and water quality system is to establish an MSIV leakage pathway to the condenser. The Unit 2 sampling lines from the main steam system are identified as being within the scope of license renewal and subject to an AMR; however, similar piping and components for Unit 1 are not identified as being within the scope of license renewal. Based on the information in the LRA, the staff could not determine why this portion of the Unit 1 sampling and water quality system is not within the scope of license renewal and subject to an AMR. Therefore, the staff requested that the applicant explain why this portion of the piping is not within the scope of license renewal and subject to an AMR.

In its response, by letter dated October 25, 2004, the applicant stated that license renewal drawings depict components subject to an AMR based on the unit's CLB. As documented in LRA Section F.1, the Unit 1 CLB for MSIV leakage does not incorporate an alternate leakage treatment pathway utilizing main steam piping and the main condenser, because this modification currently is not physically implemented for Unit 1 to match Units 2 and 3 in their configuration.

The LRA was structured to reflect CLB and configuration of all three units. Therefore, scoping and screening was done based on the CLB and configuration of all three units. The differences between the units that are relevant to the application and will be resolved prior to Unit 1 restart are listed in LRA Appendix F. This issue will be discussed in SER Section 2.6.1.1.

In addition, by letter dated January 31, 2005, the applicant provided additional supplementary information, stating that as each activity identified in LRA Appendix F is completed, the corresponding bold-bordered text in the LRA will apply to Unit 1. The applicant stated in its response that the only change to the application will be to remove the bolded border. No changes are required for scoping and screening, AMR, or TLAAs; however, in some cases, boundary drawings would change to reflect the bolded bordered text. The applicant committed to perform a secondary application review for the staff during the annual update after the modification is implemented in the plant. This will assure that the design changes to implement this modification do not modify or change the basis of how these components were initially scoped and screened.

Based on its review, the staff found the applicant's response to RAI F 2.3.3.14-1 acceptable. The Unit 1 CLB for MSIV leakage does not incorporate an alternate leakage treatment pathway utilizing the main steam piping and main condenser; therefore, this portion of piping is not

subject to an AMR. Upon completion of the modification discussed in LRA Appendix F and the January 31, 2005 letter, the CLB for Unit 1 will be the same as that for Units 2 and 3. The review of LRA Appendix F regarding Unit 1 restart will be addressed in SER Section 2.6.1.1. Therefore, the staff's concern described in RAI F 2.3.3.14-1 is resolved.

In order to resolve the seismic Class I/II interface issues discussed in RAI 2.1-2A(3) of SER Section 2.1, the applicant expanded the system boundaries for the sampling and water quality system. By letters dated January 31, 2005, and February 28, 2005, the applicant submitted the result of its review of the seismic Class I qualification documentation to identify the NSR piping, supports/equivalent anchors, or other components that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for the 10 CFR 54.4(a)(2) cases where NSR piping or components are directly connected to SR piping or components. In February 28, 2005, letter, Enclosure 2, "Mechanical Systems," the applicant stated that additional components, grab sample boxes, had been added to scope that are credited as anchorage in the seismic analysis. As a result, the component type panel was added to LRA Table 2.3.3.14.

The staff reviewed the identify support/equivalent anchors and the seismic Class II piping segments up to the first anchor point of the seismic Class I piping boundaries provided in the Enclosure 2 of the letter, dated February 28, 2005. The staff found the expanded scope of components to be acceptable because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.14.3 Conclusion

The staff reviewed the LRA and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the sampling and water quality system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the sampling and water quality system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.15 Building Heat System**

#### 2.3.3.15.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.15, the applicant described the building heat system. The building heat system is a plant-shared system that maintains the required temperatures for equipment protection and personnel comfort during the winter months. As required, the system uses forced, hot water to maintain a minimum temperature of 55 °F in various plant buildings, including the reactor building. Hot water required for the system is heated by the auxiliary boiler system and preheats the building intake air.

The building heat system contains SR components that are relied upon to remain functional during, and following, DBEs.

The intended functions within the scope of license renewal include the following:

- provides a secondary containment boundary
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.15, the applicant identified the following building heat system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, heaters, piping, pumps, and valves.

#### 2.3.3.15.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.15 and UFSAR Sections 5.3.3.6 and 10.12.5 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.15, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's related response.

In RAI 2.3.3.15-1, the staff stated that LRA Section 2.3.3.15 states that the intended function of the building heat system is to provide a secondary containment boundary. The staff identified that valves 1-1029, 1-1030, 2-1318, 2-1319, 3-1386, and 3-1387 are included in the scope of license renewal and subject to an AMR, but the connected piping on one side of these valves is not included within the scope of license renewal and not subject to an AMR. The staff could not determine if the piping on both sides of these open valves provides a secondary containment boundary. Therefore, the staff requested that the applicant provide a basis for these valves being the boundary of the piping and components that are not subject to an AMR.

In its response, by letter dated October 19, 2004, the applicant stated that valves 1-1029, 1-1030, 2-1318, 2-1319, 3-1386, and 3-1387 were included in the scope of license renewal in error and that only the piping and valves for the building heat system located in the reactor building perform a secondary containment function. Valves 1-1029, 1-1030, 2-1318, 2-1319, 3-1386, and 3-1387 are located in the turbine building and, therefore, are not within the scope

of license renewal. The applicant also stated that drawing 0-47E866-1-LR has been revised to show the boundary ending at the reactor building wall and will be resent as part of the annual update.

Based on its review, the staff found the applicant's response to RAI 2.3.3.15-1 acceptable. Valves 1-1029, 1-1030, 2-1318, 2-1319, 3-1386, and 3-1387 do not perform an intended function in accordance with the requirements of 10 CFR 54.4(a) and are outside the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.15-1 is resolved.

#### 2.3.3.15.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the building heat system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the building heat system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.16 Raw Water Chemical Treatment System**

#### 2.3.3.16.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.16, the applicant described the raw water chemical treatment system. The raw water chemical treatment system prevents bio-fouling of systems, including the EECW and RHRSW systems, that use water directly from Wheeler Reservoir. The raw water chemical treatment system provides the capability to inject a biocide into the fluid stream.

The raw water chemical treatment system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the raw water chemical treatment system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides for pressure boundary integrity to the RHRSW and EECW systems
- restricts flow
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.16, the applicant identified the following raw water chemical treatment system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, piping, restricting orifice, and valves.

#### 2.3.3.16.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.16 and UFSAR Sections 10.7.3, 10.8.4, and 10.10.4 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.3.3.16.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the raw water chemical treatment system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the raw water chemical treatment system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.17 *Demineralizer Backwash Air System***

#### 2.3.3.17.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.17, the applicant described the demineralizer backwash air system. The demineralizer backwash air system is a plant-shared system that supplies a high volume of low pressure air for purpose of backwashing plant demineralizers. In addition, the system supplies the condensate demineralizers in the turbine building and penetrates the secondary containment to supply the reactor water cleanup (RWCU) and fuel pool cooling and cleanup (FPC) demineralizers in the reactor building. The demineralizer backwash air system is in standby operation during normal operation and is operated manually, when required, for backwashing of the demineralizers.

The demineralizer backwash air system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the demineralizer backwash air system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides a secondary containment boundary
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.17, the applicant identified the following demineralizer backwash air system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, piping, traps, and valves.

#### 2.3.3.17.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.17 and UFSAR Section 5.3.3 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.3.3.17.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the demineralizer backwash air system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the demineralizer backwash air system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.18 Standby Liquid Control System**

#### 2.3.3.18.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.18, the applicant described the SLC system. The SLC system provides a backup method, independent of the control rods, to make the reactor subcritical over the full range of operating conditions. The SLC system can be manually initiated from the main control room to pump a boron neutron absorber solution into the reactor. This function is initiated if the operator determines that the reactor cannot be shut down or kept shut down with the control rods alone. During normal operation, the SLC system is in standby and must be manually initiated, if required.

The SLC system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the SLC system could prevent the satisfactory accomplishment of an SR function. In addition, the SLC system performs functions that support ATWS.

The intended functions within the scope of license renewal include the following:

- provides RCPB
- provides a primary containment boundary
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.18, the applicant identified the following SLC component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, RCPB fittings, piping, RCPB piping, pumps, tanks, tubing, valves, and RCPB valves.

#### 2.3.3.18.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.18 and UFSAR Sections 3.8, 5.2.3, and 7.19 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.18, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's response.

In RAI 2.3.3.18-1, the staff stated that component electric heaters, located inside the SLC tank, are shown on license renewal drawings 1-47E854-1-LR, 2-47E854-1-LR, and 3-47E854-1-LR as subject to an AMR. However, LRA Section 2.3.5 lists the component UNID of the heater in three different component types (fittings, heaters, or tanks). Therefore, the staff requested that the applicant identify which component type in LRA Table 2.3.3.18 includes the electric heater. Furthermore, during a telephone conference on October 7, 2004, the staff requested that the applicant justify the exclusion of a strainer, addressed in UFSAR Section 3.8.3 but not depicted on the license renewal drawings or included in LRA Table 2.3.3.18, from the scope of license renewal and from being subject to an AMR.

In its response, by letter dated October 19, 2004, the applicant stated that this heater is included in the component type "fittings" in LRA Table 2.3.3.18. The staff requested the applicant to verify that the heaters are, in fact, included in the component type "fittings." In a supplemental response, dated June 9, 2005, the applicant confirmed that the heaters are included in component type "fittings" in LRA Table 2.3.3.18 and are so documented in the

Standby Liquid Control System Report. The applicant also provided information that the strainers have been included in LRA Table 2.3.3.18 for being subject to an AMR.

Based on its review, the staff found the applicant's response to RAI 2.3.3.18-1 acceptable. It clarifies that the heater is included in the component type "fittings" in the LRA table, and it includes the strainer within the scope of license renewal and subject to an AMR. Therefore, the staff's concerns described in RAI 2.3.3.18-1 and the October 7, 2004, telephone discussion are resolved.

In order to resolve the seismic Class I/II interface issues discussed in RAI 2.1-2A(3) of SER Section 2.1, the applicant expanded the system boundaries for the standby liquid control system. By letters dated January 31, 2005, and February 28, 2005, the applicant submitted its review result of the documentation of the seismic Class I qualification to identify the NSR piping, supports/equivalent anchors, or other components that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to safety-related piping or components. In its February 28, 2005 letter, enclosure 2, "Mechanical Systems," the applicant stated that additional piping and components had been added to the scope of the standby liquid control system. However, the component types do not differ from those listed LRA Table 2.3.3.18; therefore, no changes to the standby liquid control system portion in the LRA are required.

The staff reviewed the NSR piping up to first equivalent anchor point of seismic Class I piping boundaries and found the expanded scope of components to be acceptable on the basis that the applicant had adequately identified all SLC NSR components that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### **2.3.3.18.3 Conclusion**

The staff reviewed the LRA, the accompanying scoping boundary drawings, and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the SLC system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the SLC system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.19 Off-Gas System**

#### **2.3.3.19.1 Summary of Technical Information in the Application**

In LRA Section 2.3.3.19, the applicant described the off-gas system. Each unit has a separate off-gas system, which includes subsystems that process and dispose of the gases produced during normal operation from the main condenser steam jet air ejectors, the startup condenser vacuum pumps, the condensate drain tank vent, and the steam packing exhaustor. The gases are processed to minimize any release of harmful radioactivity and are then diverted to the plant

stack for dilution and release to the atmosphere at elevation. Backdraft dampers limit the amount of radioactive release at ground level during accidents that require operation of the SGT system.

The off-gas system contains SR components that are relied upon to remain functional during, and following, DBEs.

The intended functions within the scope of license renewal include the following:

- provides flow path integrity for the release of the filtered SGT system gases to the stacks
- provides automatic closure of back-draft prevention dampers to prevent back-flow and potential ground-level release of radiation
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.19, the applicant identified the following off-gas system component types that are within the scope of license renewal and subject to an AMR: bolting, ductwork, fittings, and piping.

#### 2.3.3.19.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.19 and UFSAR Sections 1.6.1.1.10, 1.6.1.4.4, 5.3.3, 7.12.2, 7.12.3, 9.5, 11.4, 14.6.3.6, and F.7.14 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In order to resolve the seismic Class I/II interface issues discussed in RAI 2.1-2A(3) of SER Section 2.1, the applicant expanded the system boundaries for the off-gas system. By letters dated January 31, 2005, and February 28, 2005, the applicant submitted the results of its review of the seismic Class I qualification documentation to identify the NSR piping, supports/equivalent anchors, or other components that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components. In the February 28, 2005 letter, enclosure 2, "Mechanical Systems," the applicant stated that additional components, valves, had been added to the scope of the off-gas system. The component type valve was added to LRA Table 2.3.3.19.

The staff reviewed the NSR piping up to first equivalent anchor point of seismic Class I piping boundaries and found the expanded scope of components to be acceptable on the basis that the applicant had adequately identified all SLC NSR components that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.19.3 Conclusion

The staff reviewed the LRA and RAI response to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the off-gas system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the off-gas system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.3.20 Emergency Equipment Cooling Water System**

##### 2.3.3.20.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.20, the applicant described the EECW system. The EECW system is a plant-shared system, which has two headers that use dedicated RHRSW pumps to supply water from the Wheeler Reservoir into heat exchangers. The heat exchangers cool equipment including the DG engine coolers, CS pump room coolers, RHR pump seal coolers and room coolers, control bay chillers, hydrogen and oxygen containment gas analyzers, and electric board room chillers. The EECW system provides cooling water to equipment that is essential for safe shutdown and a backup cooling water supply to the reactor building closed cooling water heat exchangers.

The EECW system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the EECW system could prevent the satisfactory accomplishment of an SR function. In addition, the EECW system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides cooling water to the HVAC system chillers, RHR system pump seal coolers, containment inerting system hydrogen and oxygen gas analyzers, DG, RHR and CS equipment room coolers, and FPC system
- provides an EECW valve position interlock signal for automatic start of the RHRSW pumps
- provides a secondary containment boundary
- prevents debris from entering a system or component
- provides for flow distribution
- provides for heat transfer

- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.20, the applicant identified the following EECW system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, flexible connectors, heat exchangers, piping, restricting orifice, strainers, tubing, and valves.

#### 2.3.3.20.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.20 and UFSAR Sections 5.3, 7.18, 10.10, and F.7.17 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.20, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's response.

In RAI 2.3.3.20-1, the staff stated that License renewal drawings 1-47E859-1-LR, 2-47E859-1-LR, and 3-47E859-1-LR depict the EECW system. The cooling water return piping from the SR components terminates at locations designated as "yard drainage." LRA Table 3.3.2.20 indicates that buried carbon and low-alloy steel piping has been evaluated for aging management. However, neither the LRA nor the associated drawings adequately identify the extent of the buried piping subject to an AMR. Therefore, the staff requested that the applicant identify the extent of the buried piping and provide an appropriately marked license renewal drawing, or identify a specific structure where the piping subject to an AMR terminates. The staff also requested that the applicant justify the exclusion of any buried piping or structures between the emergency equipment cooling water system and the final discharge structure from the scope of license renewal and from being subject to an AMR.

In its response, by letter dated October 19, 2004, the applicant stated that a note had been added to license renewal drawings 1-47E859-1-LR, 2-47E859-1-LR, and 3-47E859-1-LR to state that the EECW buried piping is within the scope of license renewal up to the catch basins shown on isometric drawing 0-17W300-9.

Based on its review, the staff found the applicant's response to RAI 2.3.3.20-1 acceptable. It adequately identifies the extent of the buried emergency equipment cooling water piping that is

within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.20-1 is resolved.

#### 2.3.3.20.3 Conclusion

The staff reviewed the LRA, the accompanying scoping boundary drawings, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the EECW system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the EECW system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.3.21 Reactor Water Cleanup System**

##### 2.3.3.21.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.21, the applicant described the RWCU system. A separate RWCU system is provided for each unit. The major equipment for the RWCU system is located in the reactor building and consists of two pumps, regenerative and non-regenerative heat exchangers, and two filter/demineralizers with supporting equipment. Suction for the system is taken from the reactor vessel bottom drain and from the RHR system shutdown cooling suction line, which is supplied by the reactor coolant recirculation system. The system automatically isolates upon accident initiation and upon SLC system actuation. The RWCU system functions to maintain a high reactor-water purity to limit corrosion, chemical interactions, fouling, and deposits on reactor heat transfer surfaces. The system also removes corrosion products to limit impurities available for activation by neutron flux and the resultant radiation from deposits of corrosion products. In addition, the system provides a means for removal of water from the reactor vessel during normal operations.

The RWCU system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the RWCU system could prevent the satisfactory accomplishment of an SR function. In addition, the RWCU system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides primary and secondary containment boundaries
- provides RCPB
- provides system pressure boundary support (check valve) to HPCI to prevent diversion of HPCI system core cooling water from the reactor vessel (Unit 3 only)
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.21, the applicant identified the following RWCU system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, RCPB fittings, heat exchangers, piping, RCPB piping, pumps, restricting orifice, strainers, tanks, traps, tubing, valves, and RCPB valves.

#### 2.3.3.21.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.21 and UFSAR Sections 3.8, 4.1, 4.9, 5.2.3, 5.3, and 7.3 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.21, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated April 8, 2005, the staff issued RAIs concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 2.3.3.21-1, the staff identified thermal tees that are within the scope of license renewal and subject to an AMR. However, "thermal tees" is not a component type listed in LRA Table 2.3.3.21-1 as being subject to an AMR, nor it is included in LRA Section 2.3.5 as a component type. Therefore, the staff requested that the applicant indicate if thermal tees are already included in LRA Table 2.3.3.21 as a component type subject to an AMR, or justify the exclusion of the components from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In its response, by letter dated April 28, 2005, the applicant stated that thermal tees are included in LRA Table 2.3.3.21 as component type "fittings." Thermal tees were not listed in LRA Section 2.3.5, because these components are not assigned UNID's on drawings. LRA Section 2.3.5 was generated to show where UNID's appearing on the license renewal drawings were grouped in a component type.

Based on its review, the staff found the applicant's response to RAI 2.3.3.21-1 acceptable. because thermal tees are included as a component type that is subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.21-1 is resolved.

In RAI 2.3.3.21-2, the staff identified fusible plugs (FUPG) to be within the scope of license renewal and subject to an AMR. The drawing note associated with FUPGs states that the FUPG is a threaded pipe plug with a low temperature eutectic alloy that is attached to the RWCU pipe upstream of valve FCV-69-94. Eutectic material melts on high temperature, venting the control air line, which closes isolation valve FCV-69-94. Also, another drawing note states

that the system shall be qualified for an elevated temperature excursion up to 562 °F during an Appendix R event from the non-generative heat exchanger outlet to valve FCV-69-94.

- a. The FUPGs are neither listed in LRA Table 2.3.3.21 as a component type subject to an AMR, nor as a subcomponent of the component types listed in LRA Section 2.3.5. Therefore, the staff requested that the applicant indicate if FUPGs are already included in LRA Table 2.3.3.21 as a component type subject to an AMR, or justify the exclusion of these components from being subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).
- b. Based on the above mentioned drawing notes, it appears that valve FCV-69-94 satisfies criterion 10 CFR 54.4(a)(3) for an EQ and fire protection regulated event. However, the piping and components associated with this valve, including the above-mentioned FUPG, are shown as within the scope of license renewal in accordance with the 10 CFR 54.4(a)(2) criterion. The staff requested that the applicant explain how valve FCV-69-94 functions differently from its associated pipeline.

In its response, by letter dated April 28, 2005, the applicant stated that the FUPGs were inadvertently colored in blue on the drawing but should have been black since they are active components and are not within the scope of license renewal. The applicant also stated that the fusible plugs do not form a pressure boundary function for the RWCU system. The license renewal drawings have been revised to show FUPG-32-5105 black instead of blue, since it is not subject to an AMR.

Based on its review, the staff found the applicant's response to RAI 2.3.3.21-2a acceptable. FUPGs meet the definition for an active component and, therefore, are not subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.21-2a is resolved.

With regard to RAI 2.3.3.21-2b, the applicant stated that the piping and equipment downstream of FCV-69-2 up to and including valve FCV-69-94 will be corrected on the drawings to show the components in scope per the criteria 10 CFR 54.4a(3) and subject to an AMR, since these components form the reactor coolant pressure boundary during an Appendix R event. The tube side of the heat exchanger is considered part of the reactor coolant pressure boundary while the shell side provides the structural support for the tubes. Shell side piping connections will remain in scope. Also, System 43 in drawing 0-105E3156-1-LR will be corrected to show its components required for pressure boundary integrity in red instead of blue on the drawing, that are within the scope of license renewal and subject to an AMR, due to its interface with RWCU drawings 2-47E810-1-LR and 3-47E810-1-LR.

Based on its review, the staff found the applicant's response to RAI 2.3.3.21-2b acceptable. The applicant clarified the function of the piping and valve in question and corrected the corresponding drawings to reflect the appropriate intended function of the components. Therefore, the staff's concern described in RAI 2.3.3.21-2b is resolved.

In RAI 2.3.3.21-3, the staff stated that UFSAR (Revision 20), Section 4.9 states that:

Reactor coolant is continuously removed from the reactor coolant recirculation system, cooled in the regenerative and non-regenerative heat exchangers, filtered and demineralized, and returned to the feedwater system through the

shell side of the regenerative heat exchanger. The Unit 3 RWCU system has the capability to return process fluid to the feedwater system through both reactor feedwater lines A and B. The Unit 2 RWCU system only has one return line through reactor feedwater line B.

Only, the RWCU system return line to the reactor feedwater line B is depicted on license renewal drawing 3-47E810-1-LR. Therefore, the staff requested that the applicant indicate whether feedwater line A is within the scope of license renewal and subject to an AMR, or provide an explanation for its exclusion. The staff also asked the applicant to provide an alternative drawing that shows the RWCU system return to feedwater line A for Unit 3.

In its response, by letter dated April 28, 2005, the applicant stated that the Unit 3 RWCU system return to feedwater line A is shown on license renewal drawing 3-47E810-1-LR (at location G6). The applicant further noted that the return is through a HPCI line shown on 3-47E812-1-LR (location E6) which connects to feedwater line A shown on 3-47E803-1-LR (location G6). The HPCI and feedwater portions of this return path are within the scope of license renewal.

Based on its review, the staff found the applicant's response to RAI 2.3.3.21-3 acceptable. The applicant identified the return to feedwater line A and stated that it is within the scope of license renewal as indicated on the provided license renewal drawings. Therefore, the staff's concern described in RAI 2.3.3.21-3 is resolved.

In RAI 2.3.3.21-4, the staff identified flow indicators FI-85-75 and FI-85-77, and flow element FE-69-13 as excluded from the scope of license renewal. The flow indicators and flow element serve an intended function of pressure boundary and are passive and long-lived components. It is noted that similar flow indicators and flow elements on drawings 2-47E810-1-LR and 3-47E810-1-LR are shown to be within the scope of license renewal and subject to an AMR. However, "flow indicators" is not listed in LRA Table 2.3.3.21 as a component type subject to an AMR, nor as a subcomponent of the component types listed in LRA Section 2.3.5. Therefore, the staff requested that the applicant:

- a. Justify the exclusion of the aforementioned flow indicators and flow element in Unit 1 from the scope of license renewal and from being subject to an AMR in accordance with the requirements of 10 CFR 54.4(a) and 10 CFR 54.21(a)(1), respectively.
- b. Clarify whether flow indicators are included in other component types already listed in LRA Table 2.3.3.21, or justify their exclusion from an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In its response, by letter dated April 28, 2005, the applicant stated that NEI 95-10, Appendix B indicates that flow indicators are active components. FI 85-75 and FI 85-77 were colored blue in error on license renewal drawings 2-47E810-1-LR and 3-47E810-1-LR, but have been corrected to show these components black on the drawings; that is, not subject to an AMR. The flow element on license renewal drawing 1-47E810-1-LR was included as a fitting in the evaluation but was inadvertently not colored blue on the drawing. License renewal drawing 1-47E810-1-LR has also been revised to show that FE 69-13 is within the scope of license renewal and subject to AMR.

With regard to RAI 2.3.3.21-4b, the applicant stated that “flow indicators” is not a component type listed in LRA Table 2.3.3.21. Flow indicators were excluded from an AMR based on guidance provided in NEI 95-10 Appendix B.

On the basis of this review, the staff was unable to find the applicant’s response to RAI 2.3.3.21-4 acceptable. The applicant follows the guidance in NEI 95-10, which lists flow indicators as active components. However, the flow indicators in question are in-line indicators. The indicator portion of the component is an active component, but the piping portion of the indicator through which reactor water flows provides a pressure boundary function. Therefore, this portion of the component should be within the scope of license renewal and subject to an AMR. In a follow-up question, the staff asked the applicant to justify the exclusion of the piping portion of the flow indicators.

In a follow-up response, by letter dated May 24, 2005, the applicant stated that the pressure boundary portion of the flow indicators are in scope and are evaluated as fittings in the CRD system (system 85). License renewal drawings 1-47E810-1-LR, 2-47E810-1-LR, and 3-47E810-1-LR were revised to show that FI-75 and FI-77 are in scope and subject to an AMR for meeting the 10 CFR 54.4(A)(2) criterion. The pressure retaining portion of the flow indicators are stainless steel with internal environment of treated water, with external environment of inside air, and are already contained in LRA Table 3.3.2.29. The applicant further stated that all license renewal drawings were reviewed for in-line flow indicators that provide a pressure boundary function. This review identified the drawings for systems 43, 68, 69, and 74 that contain flow indicators with pressure boundary functions. The applicant stated that no changes to LRA tables are required since fittings contain the material and environment combinations for the in-line flow indicators, flow indicating controllers, and flow indicating switches that provide a pressure boundary function.

Based on its review, the staff found the applicant’s response to RAI 2.3.3.21-4 acceptable. The applicant included the flow indicators within the scope of license renewal and subject to an AMR. The applicant also performed a review for all other mechanical systems and identified the systems with flow indicators that form a pressure boundary. The applicant revised the system drawings accordingly by adding these flow indicators in scope. Therefore, the staff’s concern described in RAI 2.3.3.21-4 is resolved.

In RAI 2.3.3.21-5, the staff identified a 4-inch pipeline to the waste collector and surge tank inside the pipe tunnel to radwaste (location B4) excluded from the scope of license renewal. However, the same pipeline on the license renewal drawing is shown as being within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2). Therefore, the staff requested that the applicant clarify this apparent discrepancy.

In its response, by letter dated April 28, 2005, the applicant stated that the line was inadvertently colored in blue but should have been in black. The drawing was corrected to show the line in black, that is, not within the scope of license renewal.

Based on its review, the staff found the applicant’s response to RAI 2.3.3.21-5 acceptable. The applicant clarified that the piping in question is not within the scope of license renewal and corrected the corresponding drawing. Therefore, the staff’s concern described in RAI 2.3.3.21-5 is resolved.

### 2.3.3.21.3 Conclusion

The staff reviewed the LRA, the accompanying scoping boundary drawings, and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the RWCU system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the RWCU system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.22 Reactor Building Closed Cooling Water System**

#### 2.3.3.22.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.22, the applicant described the reactor building closed cooling water system. The reactor building closed cooling water system provides a continuous supply of cooling water during normal operation to designated plant equipment located in the primary and secondary containments. Water cooled in the heat exchangers provides cooling water for components such as the reactor recirculation system pumps and motor, the RWCU system pumps and non-regenerative heat exchanger, the fuel pool cooling and cleanup system heat exchanger, the drywell atmosphere cooling coils, the reactor building equipment drain sump heat exchanger, the drywell equipment drain sump heat exchanger, the drywell air compressors and aftercoolers, and the sample coolers in the sampling and water quality system. The system is normally operational and will automatically trip if an accident initiates it.

The reactor building closed cooling water system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the reactor building closed cooling water system could prevent the satisfactory accomplishment of an SR function. In addition, the reactor building closed cooling water system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides primary and secondary containment boundaries
- provides for a pressure boundary of the reactor building closed cooling water system components connected to the control air system that must maintain the boundary in support of supplying CAD to the MSRVs
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.22, the applicant identified the following reactor building closed cooling water system component types that are within the scope of license renewal and subject to an

AMR: bolting, fittings, flexible connectors, heat exchangers, piping, pumps, strainers, tanks, tubing, and valves.

As a result of the review of seismic Class I piping boundaries to identify supports and equivalent anchors in response to RAI 2.1-2A(3) (discussed in SER Section 2.1), the applicant expanded the system boundaries for the reactor building closed cooling water system. By letters dated January 31, 2005, and February 28, 2005, the applicant submitted the results of its review of the seismic Class I qualification documentation to identify the NSR piping, supports and equivalent anchors, or other components that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components. In its February 28, 2005, letter, enclosure 2, "Mechanical Systems," the applicant stated that additional piping and components had been added to the scope of the reactor building closed cooling water system. However, the component types do not differ from those listed in LRA Table 2.3.3.22 and no changes to the reactor building closed cooling water system portion of the LRA are required.

#### 2.3.3.22.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.22 and UFSAR Sections 5.2, 5.3, 10.6, and F.6.19 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.22, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued RAIs concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 2.3.3.22-1, the staff stated that license renewal drawings 2-47E610-70-1-LR and 3-47E610-70-1-LR show that the flow control valves and the combination of air filter/pressure regulators for the drywell atmospheric cooling units (A5 and B5) are within the scope of license renewal and subject to an AMR. However, the flow control valves and combination of the air filter/pressure regulators for the drywell atmospheric cooling units A4 and B4, A3 and B3, A2 and B2, and A1 and B1 are not identified as being within the scope of license renewal. Therefore, the staff requested that the applicant justify the exclusion of the flow control valves and combination air filter/pressure regulators for the drywell atmospheric cooling units A4 and B4, A3 and B3, A2 and B2, A1 and B1 components from the scope of license renewal and from being subject to an AMR.

In its response, by letter dated October 19, 2004, the applicant stated that the air filter/pressure regulators for drywell atmospheric cooling units A1 and B1, A2 and B2, A3 and B3, and A4 and B4 are not within the scope of license renewal, because they do not form a pressure boundary with the control air system (system 32).

Based on its review, the staff was unable to find the applicant's response to RAI 2.3.3.22-1 acceptable, because a drawing note (Note 6 at location F2 on license renewal drawings 2-47E610-70-1-LR and 3-47E610-70-1-LR) states:

The cooling water enters the drywell, supplying two drywell atmospheric cooling units (A and B). Each Cooling Unit has five cooling coils, four operating and one spare. Control is from the main control room by a hand switch (HS-70-16A, etc) which operates dampers and diaphragm-operated gate valves (FCV-70-16, etc). Each drywell cooling unit has five fans, any four of them may be used at one time and the fifth reserved as a spare.

Any cooling unit can be used as a spare unit, and the configuration shown on the license renewal drawings for cooling units A5 and B5 can be applied to all other cooling units. Hence, cooling units A1 through A4 and B1 through B4 also form a pressure boundary with the control air system when they are used as a spare unit. Therefore, the air filter/pressure regulators for cooling units A1 through A4 and B1 through B4 should be within the scope of license renewal and subject to an AMR. Considering the above-mentioned drawing note, the staff asked in a supplemental RAI that the applicant justify the exclusion of cooling units A1 through A4, and B1 through B4 from the scope of license renewal and from being subject to an AMR.

In a supplemental response dated June 9, 2005, the applicant stated that, based upon further review, the filter/pressure regulators for cooling units A1 through A4, and B1 through B4 will be included within the scope of license renewal, and that the license renewal drawings will be revised accordingly.

Based on its review, the staff found the applicant's response to RAI 2.3.3.22-1 acceptable. The applicant added the filter/pressure regulators for cooling units A1 through A4, and B1 through B4 to the scope of license renewal and will correct the corresponding drawings. Therefore, the staff's concern described in RAI 2.3.3.22-1 is resolved.

In RAI 2.3.3.22-2, the staff stated that the operators of the two valves FCV 70-24 and FCV 70-34 are shown on license renewal drawings 2-47E610-70-1 and 3-47E822-1 as being within the scope of license renewal and subject to an AMR. However, license renewal drawings 3-47E610-70-1, 1-47E822-1-LR, and 2-47E822-1-LR show the operators for the same valves as not within the scope of license renewal and not subject to an AMR. T, the staff requested that the applicant clarify the inconsistency and justify the exclusion of operators for FCV 70-24 and FCV 70-34 from the scope of license renewal and from being subject to an AMR.

In its response, by letter October 19, 2004, the applicant stated that the operators shown on drawings 3-47E610-70-1-LR and 2-47E822-1-LR should have been highlighted, (i.e., that they are in scope and subject to an AMR). The applicant further stated that the modification identified in Appendix F.2 had not been implemented in Unit 1; therefore, these components are not within the scope of license renewal for Unit 1. Drawings 3-47E610-70-1-LR and 2-47E822-1-LR have been revised and will be sent to the staff as part of the annual update.

Based on its review, the staff found the applicant's response to RAI 2.3.3.22-2 acceptable. It concurs that the operators addressed in the RAI should be within the scope of license renewal. Therefore, the staff's concern described in RAI 2.3.3.22-2 is resolved.

In RAI 2.3.3.22-3, the staff noted that LRA Section 2.3.3.22 states that the operators for the dampers are within the scope of license renewal as a pressure boundary for the control air. With regard to this statement, the staff requested the following information:

- a. The UNIDs assigned to various components, in particular, the dampers and the operators for the dampers, are for the reactor building closed cooling water system. Therefore, the staff requested that the applicant clarify whether or not the operators for the dampers are evaluated in the control air system.
- b. The staff also asked the applicant whether the operators shown on license renewal drawings 2-47E610-70-1-LR and 3-47E610-70-1-LR are subject to an AMR and, if so, under what component type.

In its response, by letter dated October 19, 2004, the applicant stated the following:

- a. The damper operators are part of the reactor building closed cooling water system, and are evaluated as valves in the reactor building closed cycle cooling water system. As depicted on license renewal drawings 2-47E610-70-1-LR and 3-47E610-70-1-LR, the damper operators support the control air system (system 32) pressure boundary. Since these damper operators are connected to the control air system, they must maintain a pressure boundary in order for the control air system to maintain its system boundary (i.e., form a pressure boundary). Therefore, any damper operators that are required to form a pressure boundary with the control air system are within the scope of license renewal for the control air system.

Based on its review, the staff found the applicant's response to RAI 2.3.3.22-3a acceptable. It clarifies that the damper operators have a pressure boundary intended function and are within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.22-3a is resolved.

In its response, by letter dated October 19, 2004, the applicant further stated the following:

- b. The damper operators are subject to an AMR and are included as part of the component type "valves" in LRA Table 2.3.3.22.

Based on its review, the staff found the applicant's response to RAI 2.3.3.22-3b acceptable. It confirms that the damper operators are subject to an AMR and are included in LRA Table 2.3.3.22. Therefore, the staff's concern described in RAI 2.3.3.22-3b is resolved.

The staff also reviewed the results of the applicant's review of seismic Class I piping boundaries provided in the applicant's letter, dated February 28, 2005, enclosure 2, to identify supports and equivalent anchor points in response to RAI 2.1-2A(3). The staff found the expanded scope of components to be acceptable on the basis that the applicant had adequately identified all reactor building closed cooling water system NSR components that meet the scoping criterion

of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.22.3 Conclusion

The staff reviewed the LRA, the accompanying scoping boundary drawings, and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the reactor building closed cooling water system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the reactor building closed cooling water system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.3.23 Reactor Core Isolation Cooling System**

##### 2.3.3.23.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.23, the applicant described the RCIC system. The RCIC system provides makeup water to the reactor vessel during shutdown and also provides isolation from the main heat sink to supplement or replace the normal makeup water sources. The system also includes associated valves and piping capable of delivering makeup water to the reactor vessel. During normal operation, the system is in standby and initiates, automatically, when required. The RCIC system has automatic isolation provisions to ensure the integrity of the primary containment.

The RCIC system contains SR components that are relied upon to remain functional during, and following, DBEs. In addition, the RCIC system performs functions that support fire protection, EQ, ATWS, and SBO.

The intended functions within the scope of license renewal include the following:

- provides RCPB
- provides primary and secondary containment boundaries
- provides for a system pressure boundary in support of the residual heat removal system containment (torus) cooling function
- establishes MSIV leakage pathway to the condenser
- provides sufficient reactor coolant makeup to maintain the reactor in a safe condition
- provides debris protection
- restricts flow
- provides for heat transfer
- provides mechanical closure

- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.23, the applicant identified the following RCIC system component types that are within the scope of license renewal and subject to an AMR: bolting, condenser, expansion joint, fittings, RCPB fittings, flexible connector, heat exchangers, piping, RCPB piping, pumps, restricting orifice, RCPB restricting orifice, strainers, tanks, traps, tubing, turbines, valves, and RCPB valves.

#### 2.3.3.23.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.23 and the UFSAR Sections 4.1, 4.7, 5.2.3, 5.3, 7.3, and 7.18 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.23, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated October 8, 2004, the staff issued an RAI concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4 (a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 2.3.3.23-1, the staff stated that UFSAR Section 4.7.5, states that the RCIC makeup water is delivered into the reactor vessel through a connection to the feedwater line and is distributed within the reactor vessel through the feedwater sparger. The connection to the feedwater line is provided with a thermal sleeve. It is further stated that the thermal sleeve (liner) in the feedwater line is designed as a nonpressure-containing liner and is provided to protect the pressure-containing piping tee from excessive thermal stress. In LRA Table 2.3.3.23, thermal sleeve (liner) was not identified as a component type within the scope of license renewal. Therefore, the staff requested the applicant to include this component type within the scope of license renewal and AMR.

In its response, by letter dated November 3, 2004, the applicant stated that the material for this component was identified as pipe and pipe fitting in the feedwater system and will be inspected as part of the One-Time Inspection Program.

Based on its review, the staff found the applicant's response to RAI 2.3.3.23-1 acceptable. The applicant included the subject component and its intended functions within the scope requiring an AMR. Therefore, the staff's concern described in RAI 2.3.3.23-1 is resolved.

### 2.3.3.23.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the RCIC system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the RCIC system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.24 Auxiliary Decay Heat Removal System**

#### 2.3.3.24.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.24, the applicant described the auxiliary decay heat removal (ADHR) system. The ADHR system can be used to remove residual heat from the spent fuel pool and reactor cavity during outages. The ADHR system supplements the fuel pool cooling and cleanup system and consists of two cooling water loops. The primary cooling loop circulates water from the spent fuel pool entirely inside the reactor building and rejects heat from the spent fuel pool to a secondary loop via a heat exchanger. The secondary loop transfers heat to the atmosphere outside of the reactor building by the means of evaporative cooling towers.

The ADHR system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the ADHR system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides a secondary containment boundary
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.24, the applicant identified the following ADHR system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, heat exchangers, piping, pumps, strainers, tubing, and valves.

#### 2.3.3.24.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.24 and UFSAR Sections 5.3, 10.5, and 10.22 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant

had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In order to resolve the seismic Class I/II interface issues discussed in RAI 2.1-2A(3) of SER Section 2.1, the applicant expanded the system boundaries for the ADHR system. By letters dated January 31, 2005, and February 28, 2005, the applicant submitted the results of its review of the seismic Class I qualification documentation to identify the NSR piping, supports and equivalent anchors, or other components that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for the 10 CFR 54.4(a)(2) cases where NSR piping or components are directly connected to SR piping or components. In its February 28, 2005, letter, enclosure 2, "Mechanical Systems," the applicant stated that additional piping and components had been added to the scope of the ADHR system; however, the component types do not differ from those listed in LRA Table 2.3.3.24 and no changes to the ADHR system portion of the LRA are required.

The staff reviewed the NSR piping up to first equivalent anchor point of seismic Class I piping boundaries and found the expanded scope of components to be acceptable on the basis that the applicant had adequately identified all SLC NSR components that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.24.3 Conclusion

The staff reviewed the LRA and RAI response to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the ADHR system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the ADHR system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.25 Radioactive Waste Treatment System**

#### 2.3.3.25.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.25, the applicant described the radioactive waste treatment system. The radioactive waste treatment system is comprised of subsystems that process solid and liquid radwaste that is generated during normal plant operation. The subsystems are plant-shared systems.

The radioactive waste treatment system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the radioactive waste treatment system could prevent the satisfactory accomplishment of an SR function. In addition, the radioactive waste treatment system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides primary and secondary containment boundaries
- provides piping interface integrity with the SGT system and the off-gas system in support of the release of filtered SGT gases through the stack
- provides a pressure boundary of the radioactive waste treatment system components connected to the control air system that must maintain a pressure boundary in support of supplying CAD to the MSRVs
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.25, the applicant identified the following radioactive waste treatment system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, heat exchangers, piping, pumps, restricting orifices, tanks, strainers, tubing, and valves.

#### 2.3.3.25.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.25 and UFSAR Sections 4.10, 5.2, 5.3, 9.1, 9.2, 9.3, 9.5, 10.16, F.6.7, F.6.8, F.6.20, and F.7.14 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In order to resolve the 10 CFR 54.4(a)(2) issues regarding NSR piping segments that support secondary containment discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1, the applicant expanded the system boundaries for the radioactive waste treatment system. By letter dated May 31, 2005, the applicant submitted the NSR piping, supports, and other components outside secondary containment required to maintain the structural integrity of secondary containment that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for secondary containment qualification. In the enclosure to its letter dated May 31, 2005, the applicant stated that additional piping had been added to scope. However, the component type does not differ from those listed in LRA Table 2.3.3.25; therefore, no changes to the radioactive waste treatment system portion of the LRA are required.

The applicant also expanded the system boundaries for the radioactive waste treatment system to resolve seismic Class I/II interface issues discussed in RAI 2.1-2A(3) of SER Section 2.1. By letters dated January 31, 2005, and February 28, 2005, the applicant submitted the results of its review of the seismic Class I qualification documentation to identify the NSR piping,

supports/equivalent anchors, or other components that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for the (a)(2) cases where NSR piping or components are directly connected to SR piping or components. In its February 28, 2005 letter, enclosure 2, "Mechanical Systems," the applicant stated that additional piping and components were added to the scope in the cleanup decant pump room in the radwaste building. The component types do not differ from those listed in LRA Table 2.3.3.25; therefore, no changes to the radioactive waste treatment system portion of the LRA are required. In its response, the applicant explained that notes had been added to the radioactive waste treatment drawing to clarify that embedded piping is in scope for anchorage when attached to non-embedded in-scope piping and all the piping between the embedded piping and in-scope non-embedded piping is within the scope of license renewal.

The staff reviewed the results of the applicant's evaluation of NSR piping segments that support secondary containment in response to RAI 2.1-2A(1) and (2), and the results of the applicant's evaluation of seismic Class I piping boundaries in its response to RAI 2.1-2A(3). The staff found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.25.3 Conclusion

The staff reviewed the LRA and RAI response to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the radioactive waste treatment system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the radioactive waste treatment system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.3.26 Fuel Pool Cooling and Cleanup System**

##### 2.3.3.26.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.26, the applicant described the FPC system. The FPC system removes residual heat from the fuel assemblies and maintains the fuel pool water within the specified temperature limits. The system minimizes corrosion product buildup and controls water clarity in the fuel pool so that the fuel assemblies can be efficiently handled underwater. In addition, the FPC system minimizes fission product concentration in the fuel pool water. The system is in normal operation and additional provisions can be made to prevent siphoning of the fuel pool. A cross-connection exists with the RHR system; the RHR system can provide supplemental cooling, if needed.

The FPC system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the FPC system could prevent the satisfactory

accomplishment of an SR function. In addition, the FPC system performs functions that support fire protection.

The intended functions within the scope of license renewal include the following:

- provides a secondary containment boundary
- provides for pressure boundary integrity at the RHR/FPC interface
- prevents inadvertent siphoning of the spent fuel pool
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.26, the applicant identified the following FPC system component types that are within the scope of license renewal and subject to an AMR: bolting, expansion joint, fittings, heat exchangers, piping, pumps, restricting orifice, tanks, tubing, and valves.

#### 2.3.3.26.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.26 and UFSAR Sections 4.8, 5.3, 10.5, 10.17, and 10.22 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments that support secondary containment, the applicant expanded the system boundaries for the fuel pool cooling and cleanup system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components outside secondary containment required to maintain the structural integrity of secondary containment that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for secondary containment qualification. In the enclosure to its letter dated May 31, 2005, the applicant stated that additional piping had been added to scope. However, the component type does not differ from those listed in LRA Table 2.3.3.26; therefore, no changes to the fuel pool cooling and cleanup system portion of the LRA are required.

The applicant also expanded the system boundaries for the FPC system to resolve the seismic Class I/II interface issues discussed in RAI 2.1-2A(3) of SER Section 2.1. By letters dated January 31, 2005, and February 28, 2005, the applicant submitted the results of its review of the seismic Class I qualification documentation to identify the NSR piping, supports/equivalent anchors, or other qualification documentation to identify the NSR piping, supports/equivalent anchors, or other components that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for the (a)(2) cases in which NSR piping or components

are directly connected to SR piping or components. In the February 28, 2005 letter, enclosure 2, "Mechanical Systems," the applicant stated that additional piping and components had been added to the scope of the FPC system. However, the component types do not differ from those listed in LRA Table 2.3.3.26; therefore, no changes to the FPC system portion of the LRA are required.

The staff reviewed the results of the applicant's evaluation of NSR piping segments that support secondary containment in response to RAI 2.1-2A(1) and (2), and the results of the applicant's evaluation of seismic Class I piping boundaries in its response to RAI 2.1-2A(3). The staff found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.26.3 Conclusion

The staff reviewed the LRA and RAI response to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the FPC system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the FPC system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.27 Fuel Handling and Storage System**

#### 2.3.3.27.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.27, the applicant described the fuel handling and storage system. Each unit is provided with a dry, new fuel storage vault. The new fuel storage racks provide a location in the vaults where new fuel can be stored. The racks are designed to preclude criticality even if the new fuel storage vault is flooded. Each reactor also has a spent fuel storage pool. A transfer canal is provided to join the pools for Units 1 and 2. The spent fuel storage racks provide a location where spent fuel, received from the reactor vessel, can be stored at the bottom of each fuel pool. The racks are full length, top entry, and are designed to maintain the spent fuel in a spatial geometry that precludes the possibility of criticality. The racks are comprised of staggered, stainless-steel container tubes. Each tube wall has a core of Boral sandwiched within stainless steel. Servicing equipment is provided to facilitate refueling, fuel inspection, and fuel maintenance.

The fuel handling and storage system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the fuel handling and storage system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides NSR components that ensure the satisfactory performance of SR components
- provides structural support

In LRA Table 2.3.3.27, the applicant identified the following fuel handling and storage system component types that are within the scope of license renewal and subject to an AMR: bolting and fasteners, fuel preparation machines, and the refueling platform (including the assembly, rails, and main fuel grapple).

#### 2.3.3.27.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.27 and UFSAR Sections 10.2, 10.3, 10.4, and 10.5 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.27, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's related response.

In RAI 2.3.3.27-1, the staff stated that LRA Section 2.3.3.27 states that the portions of the fuel handling and storage system that contain components subject to an AMR are the fuel preparation machines, refueling platform (assembly, rails, and the main fuel grapple), and the bolting and fasteners associated with the refueling platform and fuel preparation machines. LRA Table 2.3.3.27 lists components associated with the fuel handling and storage systems that are subject to an AMR. UFSAR Section 10.4 (in Table 10.4-1, "Tools and Servicing Equipment") lists fuel servicing equipment, including general purpose grapple, channel transfer grapple, fuel inspection fixture, and new fuel inspection stand, but none of these are referenced in LRA Section 2.3.3.27. In reviewing LRA Section 2.3.3.27, the staff also found that no drawings are provided for this system. There is insufficient information for the staff to determine whether these components are within the scope of license renewal and subject to an AMR. Therefore, the staff requested that the applicant identify which of these components are within the scope of license renewal and subject to an AMR.

In its response, by letter dated October 19, 2004, the applicant stated the general purpose grapple, channel transfer grapple, and fuel inspection fixture are within the scope of license renewal; however, an AMR is not required for these components since they are active (i.e., they change configuration). The applicant also stated that the new fuel inspection stand is not SR

and does not meet the criterion in 10 CFR 54.4(a)(1). The new fuel inspection stand is also not required for any of the 10 CFR 54.4(a)(3) regulated events. The applicant further stated that the new fuel inspection stand failure would not prevent the accomplishment of an SR intended function of an SR component and does not meet the requirements of 10 CFR 54.4(a)(2).

Based on its review, the staff found the applicant's response to RAI 2.3.3.27-1 acceptable. The applicant had adequately clarified that the components in question are either active or do not meet any of the requirements of 10 CFR 54.4(a). Therefore, the staff's concern described in RAI 2.3.3.27-1 is resolved.

#### 2.3.3.27.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the fuel handling and storage system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the fuel handling and storage system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.28 Diesel Generator System**

#### 2.3.3.28.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.28, the applicant described the diesel generator (DG) system. The DG system is a plant-shared system that consists of four independent DG units, coupled as an alternate independent source of power to four 4160 V shared shutdown boards for Units 1 and 2. There are four additional DG units that provide an alternate independent source of power to four Unit 3 4160 V shutdown boards. The DG system provides an alternate source of power for the ECCS and the safe shutdown systems when the normal power supplies are unavailable. The DGs are normally in standby and can start automatically, when required.

The DG system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the DG system could prevent the satisfactory accomplishment of an SR function. In addition, the DG system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- starts standby AC power source for the 4kV system
- provides power to the 4kV system upon DG availability and loss of offsite power
- provides DG power to diesel fuel transfer pumps
- provides debris protection
- provides for heat transfer

- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.28, the applicant identified the following DG system component types that are within the scope of license renewal and subject to an AMR: bolting, ductwork, fan housings, fittings, flexible connectors, heat exchangers, heaters, piping, pumps, silencer, strainers, tanks, tubing, valves, and RCPB valves.

#### 2.3.3.28.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.28 and UFSAR, Sections 7.4, 7.18, 8.4, 8.5, 8.10, and F.7.9 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.28, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's response.

In RAI 2.3.3.28-1, the staff identified two components (governor and drain pan) in the DG lube oil subsystem that are not subject to an AMR; however, the piping into and out of these components is subject to an AMR. Therefore, the staff requested that the applicant justify the exclusion of the subject components from within the scope of license renewal and an AMR.

In its response, by letter dated October 19, 2004, the applicant stated that the governor is a controller that is an active component based on components listed in Appendix B of NEI 95-10, Revision 3, and does not require an AMR. With regard to the drain pan, the applicant stated that the drain pan is not within the scope of license renewal since it does not perform a 10 CFR 54.4(a)(1) or 10 CFR 54.4(a)(3) function. The drain pan would also not be in scope for 10 CFR 54.4(a)(2) since it is not normally fluid-filled and does not present a spray hazard. During a teleconference on May 11, 2005, the applicant clarified that the drain pan is attached to the DG frame and is not in any way attached to or functionally associated with the lube oil system. Its only purpose is to collect any spillage during maintenance when replacing the oil filter. Additionally, the piping, valves, and fittings attached to the drain pan, as shown in the license renewal drawings 0-47E861-5-LR through 0-47E861-8-LR and 3-47E861-5-LR through 3-47E861-8-LR, were inadvertently colored as being within the scope of license renewal and subject to an AMR. These drawings have been revised to reflect that these valves, piping, and

fittings are not within the scope of license renewal and not subject to an AMR. The changes will be incorporated in the next annual update.

Based on its review, the staff found the applicant's response to RAI 2.3.3.28-1 acceptable. It justified the exclusion of the governor from an AMR. The applicant also clarifies that the piping, valves, and fittings attached to the drain pan had been colored inadvertently and that the drain pan does not perform a license renewal intended function per 10 CFR 54.4. Therefore, the staff's concern described in RAI 2.3.3.28-1 is resolved.

#### 2.3.3.28.3 Conclusion

The staff reviewed the LRA, the accompanying scoping boundary drawings, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the DG system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the DG system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.29 Control Rod Drive System**

#### 2.3.3.29.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.29, the applicant described the CRD system. The CRD system provides reactivity control by allowing positioning of the control rods at a controlled rate during normal operation; providing scram and diverse scram functions to ensure rapid shutdown, when required; limiting the rod drop rate to minimize the consequences of a rod drop accident; and limiting a rod ejection accident.

From the hydraulic control units, the portions of the system that are subject to an AMR extend to, and from, each control rod housing. From the hydraulic control units, the portions of the system that are subject to an AMR extend to, and then include, the scram discharge volume and associated components. From the hydraulic control units, portions of the system subject to an AMR extend to an interconnection with the RWCU system. The CRDs themselves are short-lived components and, hence, are not subject to an AMR; however, the CRD housing support is subject to an AMR and is included in the component supports commodity group, which is discussed in another section of this SER.

The CRD system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the CRD system could prevent the satisfactory accomplishment of an SR function. In addition, the CRD system performs functions that support fire protection, EQ, ATWS, and SBO.

The intended functions within the scope of license renewal include the following:

- provides primary and secondary containment boundaries
- provides RCPB
- provides housing support to keep the rods in place
- limits the rod drop rate to less than 3.11 feet per second
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.29, the applicant identified the following CRD system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, RCPB fittings, heat exchangers, piping, RCPB piping, pumps, restricting orifice, rupture disk, strainers, RCPB strainers, tanks, tubing, valves, and RCPB valves.

#### 2.3.3.29.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.29 and UFSAR Sections 3.4, 3.5, 3.7, 5.2.3, 5.3, 7.7, 7.19, and F.7.12 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.3.3.29.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the CRD system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the CRD system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.30 Diesel Generator Starting Air System**

#### 2.3.3.30.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.30, the applicant described the DG starting air system. The DG starting air system starts the DGs when required. Each DG has an independent starting air system. Each system has two independent subsystems that are both capable of starting their respective DG. Each subsystem consists of an air compressor with associated filters and coolers, and a bank

of air receivers. The air compressors operate automatically to maintain the receivers in a pressurized state. The DG starting air system is located in the DG buildings.

The DG starting air system contains SR components that are relied upon to remain functional during, and following, DBEs. In addition, the DG starting air system performs functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides diesel starting air to the DG system
- provides debris protection
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.30, the applicant identified the following DG starting air system component types that are within the scope of license renewal and subject to an AMR: bolting, diesel air start motor, fittings, flexible connectors, piping, strainers, tanks, tubing, and valves.

#### 2.3.3.30.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.30 and UFSAR Section 8.5.3.3 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In order to resolve the seismic Class I/II interface issues discussed in RAI 2.1-2A(3) of SER Section 2.1, the applicant expanded the system boundaries for the diesel generator starting air system. By letters dated January 31, 2005, and February 28, 2005, the applicant submitted the results of its review of the seismic Class I qualification documentation to identify the NSR piping, supports/equivalent anchors, or other components that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components. In the February 28, 2005 letter, enclosure 2, "Mechanical Systems," the applicant stated that additional piping and components had been added to scope in association with the outlet filter of the air dryer skid, which is credited as an anchor in the seismic analysis. However, the component types do not differ from those listed in LRA Table 2.3.3.30; therefore, no changes to the diesel generator starting air system portion of the LRA are required. The staff reviewed applicant's submittals and found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.30.3 Conclusion

The staff reviewed the LRA and RAI response to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the DG starting air system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the DG starting air system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.3.31 Radiation Monitoring System**

##### 2.3.3.31.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.31, the applicant described the radiation monitoring system. The radiation monitoring system consists of a number of radiation monitors and monitoring systems that are provided on process liquid and gas lines that may serve as discharge routes for radioactive materials.

The radiation monitoring system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the radiation monitoring system could prevent the satisfactory accomplishment of an SR function. In addition, the radiation monitoring system performs functions that support EQ.

The intended functions within the scope of license renewal include the following:

- provides primary and secondary containment boundaries
- provides system pressure boundary integrity (with all mechanical joints and components associated with the offline liquid monitors) to RHRSW system cooling water for RHR system heat exchangers
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.31, the applicant identified the following radiation monitoring system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, flex hose, piping, pumps, strainers, traps, tubing, and valves.

##### 2.3.3.31.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.31 and UFSAR Sections 5.2.3, 7.12, 7.13, 7.14, 7.15, and F.7.5 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.31, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's response.

In RAI 2.3.3.31-1, the staff identified the following monitors as being subject to an AMR:

- gas monitors
- RHR heat exchanger A & C service water discharge radiation monitor
- RHR heat exchanger B & D service water discharge radiation monitor
- raw cooling water radiation monitor
- reactor building closed cooling water radiation monitor

The monitor housing performs a pressure boundary intended function; however, the housing is not listed in LRA Table 2.3.3.31 as a component type subject to an AMR. LRA Section 2.3.5 does not include housing as a part of any component group. Therefore, the staff requested that the applicant clarify whether housings are considered to be part of a component group already listed in LRA Table 2.3.3.31.

In its response, by letter dated October 19, 2004, the applicant stated that the radiation monitor sample chambers (housings) are included as part of the component type "fittings" in LRA Table 2.3.3.31.

Based on its review, the staff found the applicant's response to RAI 2.3.3.31-1 acceptable. It clarifies that the monitor housings are already included in LRA Table 2.3.3.31 in the component type "fittings" as being subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.31-1 is resolved.

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments that support secondary containment, the applicant expanded the system boundaries for the radiation monitoring system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components outside secondary containment required to maintain the structural integrity of secondary containment that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for secondary containment qualification. In the enclosure to its letter dated May 31, 2005, the applicant stated that additional components associated with radiation monitor RM 90-250 had been added to scope. However, the component types do not differ from those listed in LRA Table 2.3.3.31; therefore, no changes to the radiation monitoring system portion of the LRA are required. The staff reviewed applicant's submittal and found the

expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.3.31.3 Conclusion

The staff reviewed the LRA and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the radiation monitoring system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the radiation monitoring system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.32 Neutron Monitoring System**

#### 2.3.3.32.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.32, the applicant described the neutron monitoring system. The neutron monitoring system detects conditions in the core that threaten the overall integrity of the fuel barrier due to excessive power generation. The system also provides signals to the reactor protection system so that the release of radioactive material from the fuel barrier is limited. In addition, the neutron monitoring system provides information for the efficient, expeditious operation and control of the reactor. Conditions that could lead to local fuel damage are detected by the system and used to prevent such damage.

The neutron monitoring system contains SR components that are relied upon to remain functional during, and following, DBEs.

The intended functions within the scope of license renewal include the following:

- provides RCPB
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.3.32, the applicant identified the following neutron monitoring system component types that are within the scope of license renewal and subject to an AMR: bolting and RCPB fittings.

#### 2.3.3.32.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.32 and the UFSAR Sections 3.7 and 7.5 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in the NRC's SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.32, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated October 8, 2004, the staff issued an RAI concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4 (a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 2.3.3.32-1, the staff stated that LRA Section 2.3.3.32 states that the average power range monitor subsystem averages the local power range monitor subsystem signals to provide an overall indication of reactor power for control and trip functions. A subsystem of the average power range monitor subsystem, the oscillation power range monitor (OPRM) ensures reactor operation in a stable thermal-hydraulic region. The rod block monitor (RBM) receives input from local power range monitors close to a control rod to prevent fuel damage in the event of a rod withdrawal error. Furthermore, it was stated in the LRA that the portions of the neutron monitoring system that contain components subject to an AMR are only those that form part of the reactor coolant pressure boundary. The staff believes that in addition to the portions that are pressure boundary, OPRM and its functions, as described above, are passive and SR; and hence meet the criteria delineated in 10 CFR 54.4(a)(1) and 10 CFR 54.21(a)(1). Therefore, unless the OPRM is subject to replacement based on a "qualified life" or "specified time period," or degradation of its ability to perform its intended functions due to aging is readily monitorable, the component should be within the scope requiring aging management. Therefore, the staff requested the applicant to provide a justification for why these components are not within the scope of license renewal.

The staff also requested the applicant to provide the basis for excluding other neutron monitoring subsystems in BFN (except portions that perform pressure boundary function) from within the scope of license renewal.

In its response, by letter dated November 3, 2004, the applicant stated that LRA Section 2.3 lists the mechanical scoping and screening results. The only mechanical SR passive intended function of the neutron monitoring system is reactor coolant pressure boundary. The scoping and screening results for the electrical components of the neutron monitoring system are addressed in LRA Section 2.5. The applicant further stated that the "spaces approach" was utilized for scoping of electrical components, which does not exclude any electrical components from the scope of license renewal. The applicant included the subject components and its intended functions within the scope requiring an AMR.

Based on its review, the staff found the applicant's response to RAI 2.3.3.32-1 acceptable. The applicant included the subject components and their intended functions within the scope requiring an AMR. Therefore, the staff's concern described in RAI 2.3.3.32-1 is resolved.

### 2.3.3.32.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the neutron monitoring system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the neutron monitoring system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.33 Traversing In-Core Probe System**

#### 2.3.3.33.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.33, the applicant described the traversing in-core probe (TIP) system. The TIP system provides a signal proportional to the axial flux distribution at selected core locations where the local power range monitor detector assemblies are located. This signal allows reliable calibration of the power range monitor amplifiers. The TIP drive mechanism uses a detector that is attached to a flexible drive cable, which is driven from outside the primary containment by a gear box assembly. The flexible cable is contained by guide tubes that penetrate the reactor vessel and continue into the reactor core through a dry tube in a local power range monitor assembly. Provisions are made for automatic retraction of the detection and isolation of the primary containment penetration, when required.

The TIP system contains SR components that are relied upon to remain functional during, and following, DBEs.

The intended functions within the scope of license renewal include the following:

- provides primary containment boundary isolation and integrity (active isolation function is not required)
- provides pressure boundary

In LRA Table 2.3.3.33, the applicant identified the following TIP system component types that are within the scope of license renewal and subject to an AMR: fittings, tubing, and valves.

#### 2.3.3.33.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.33 and the UFSAR 5.2.3, 7.3, and 7.5 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as

being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.3.3.33.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the TIP system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the TIP system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.34 Cranes System**

#### 2.3.3.34.1 Summary of Technical Information in the Application

In LRA Section 2.3.3.34, the applicant described the cranes system. The cranes system includes numerous plant load-handling devices that are used for maintenance of selected plant components.

The portions of the cranes system containing components subject to an AMR include the structural portions of the cranes in structures with SR components.

The failure of SR SSCs in the cranes system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides NSR components that ensure the satisfactory performance of SR components
- provides structural support

In LRA Table 2.3.3.34, the applicant identified the following cranes system component types that are within the scope of license renewal and subject to an AMR: bolting and fasteners, monorails, rail, rail clips, and structural girders.

#### 2.3.3.34.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.34 and UFSAR Section 12.2 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant

had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.3.34, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued an RAI concerning the specific issue to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's related response.

In RAI 2.3.3.34-1, the staff stated that in reviewing the cranes system described in LRA Section 2.3.3.34, the staff found that no drawings had been provided for this system. There is insufficient information for the staff to determine which cranes are within the scope of license renewal in accordance with 10 CFR 54.4(a)(2). In addition, mobile A-frames mentioned in LRA Section 2.1.2.2 are not mentioned in LRA Section 2.3.3.34 or in the UFSAR. Therefore, the staff requested that the applicant identify which cranes are within the scope of license renewal and subject to an AMR, and whether the mobile A-frames are within the scope of license renewal.

In its response, by letter dated October 19, 2004, the applicant stated that the buildings that contain NSR cranes and monorails that could prevent SR SSCs from performing their intended function(s) are the reactor building, primary containment, DG building, intake pumping station, and the reinforced concrete chimney. All cranes and monorails in these buildings are within the scope of license renewal. The applicant further stated that the mobile A-frames are cranes on wheels. These A-frames are within the scope of license renewal since they could be used in an SR building, they are also subject to an AMR.

Based on its review, the staff found the applicant's response to RAI 2.3.3.34-1 acceptable. It identifies the buildings containing the cranes that are within the scope of license renewal to meet the 10 CFR 54.4(a)(2) requirements, and it confirms that the mobile A-frames are within the scope of license renewal and subject to an AMR. Therefore, the staff's concern described in RAI 2.3.3.34-1 is resolved.

#### 2.3.3.34.3 Conclusion

The staff reviewed the LRA and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the cranes system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the cranes system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

## **2.3.4 Steam and Power Conversion Systems**

In LRA Section 2.3.4, the applicant identified the structures and components of the steam and power conversion systems that are subject to an AMR for license renewal.

The applicant described the supporting structures and components of the steam and power conversion systems in the following sections of the LRA:

- 2.3.4.1 main steam system
- 2.3.4.2 condensate and demineralized water system
- 2.3.4.3 feedwater system
- 2.3.4.4 heater drains and vents system
- 2.3.4.5 turbine drains and miscellaneous piping system
- 2.3.4.6 condenser circulating water system
- 2.3.4.7 gland seal water system

The corresponding sections of this SER (2.3.4.1 – 2.3.4.7) present the staff's review findings with respect to the steam and power conversion systems for BFN.

### **2.3.4.1 Main Steam System**

#### **2.3.4.1.1 Summary of Technical Information in the Application**

In LRA Section 2.3.4.1, the applicant described the MS system. Each unit has its own MS system that consists of four MS lines that transfer steam from the reactor vessel to the various steam loads in the turbine building during normal plant operation. Two MSIVs are provided in each steam line to isolate the RCPB and the primary containment. A flow restrictor allows for the measurement of steam flow and also limits the steam flow rate in the event of a downstream steam line break. MSRVs are provided for overpressure protection and for depressurization following small-break LOCAs. Main steam components downstream of the MSIVs are credited in analyses for MSIV alternate leakage treatment.

The MS system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the MS system could prevent the satisfactory accomplishment of an SR function. In addition, the MS system performs functions that support fire protection, EQ, and SBO.

The intended functions within the scope of license renewal include the following:

- provides for opening of safety relief valves (SRVs) during high reactor pressure to provide reactor pressure vessel relief
- provides MS line flow restrictors to passively limit the mass flow rate of the coolant being ejected following a steam-line break until MSIV closure occurs
- provides RCPB
- provides primary and secondary containment boundaries
- provides steam for the HPCI turbine

- establishes an MSIV leakage pathway to the condenser
- provides steam for the RCIC turbine
- restricts flow
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.4.1, the applicant identified the following MS system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, RCPB fittings, piping, RCPB piping, restricting orifice, RCPB restricting orifice, strainers, tubing, valves, and RCPB valves.

#### 2.3.4.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.1 and UFSAR Sections 3.7, 4.1, 4.4, 4.5, 4.6, 4.11, 5.2.3, 5.3, 6.4.2, 7.2, 7.3, 7.4, 7.10, 7.11, 7.12, 7.18, 11.2, and 11.5 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.4.1, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated October 8, 2004, the staff issued RAIs concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI F 2.3.4.1-1, the staff stated that providing a leakage pathway from the MSIVs to the main condenser is one of the intended functions of the main steam system. Regarding Unit 1, LRA Appendix F states that the segment of the main steam piping from the outermost isolation valve up to the turbine stop valve, the bypass/drain piping to the main condenser and the main condenser itself is being evaluated and modified as required to ensure that structural integrity during and after a safe shutdown earthquake (SSE) is maintained. The staff identified that portions of the main steam system (from the turbine building on) are not shown on license renewal drawing 1-47E801-1-LR as being subject to an AMR. However, similar segments of piping are shown as being subject to an AMR on license renewal drawings 2-47E801-1-LR and 3-47E801-1-LR. It is not clear to the staff, on the basis of a review of the drawings and the information provided in LRA Sections 2.1 and F.1 of Appendix F, why the sections of piping on license renewal drawing 1-47E801-1-LR are not subject to an AMR. Therefore, the staff

requested that the applicant justify the exclusion of the piping sections in question from being within the scope of license renewal and from being subject to an AMR.

In its response, by letter dated October 25, 2004, the applicant stated that license renewal drawings depict components subject to an AMR based on the units' CLB. As documented in Appendix F.1 of the LRA, the Unit 1 CLB for MSIV leakage does not incorporate an alternate leakage treatment pathway utilizing main steam piping and the main condenser because currently this modification is not physically implemented for Unit 1 to match Units 2 and 3 in their configuration.

The LRA was structured to reflect the configuration and CLB of all three units. Scoping and screening was done based on the CLB and configuration of all three units. The differences between the units that are relevant to the application and will be resolved prior to Unit 1 restart are listed in LRA Appendix F.

In addition, by letter dated January 31, 2005, the applicant provided additional/supplementary information, stating that as each activity identified in Appendix F is completed, the corresponding bold-bordered text in the LRA will apply to Unit 1. The applicant stated in its response that the only change to the application will be to remove the bolded border. No changes are required for scoping and screening, or AMR results, or TLAA's. However, in some cases, boundary drawings would change to reflect the bold-bordered text. The applicant committed to perform a secondary application review after the modification is implemented in the plant for Unit 1, and license renewal drawing 1-47E801-1-LR will be revised and submitted during the annual update. This will assure that the design changes that implement this modification do not modify or change the basis of how these components were initially scoped and screened.

Based on its review, the staff found the applicant's response to RAI F 2.3.4.1-1 acceptable. The Unit 1 CLB for MSIV leakage does not incorporate an alternate leakage treatment pathway utilizing the main steam piping and main condenser and, therefore, this portion of piping is not subject to an AMR at this time. Upon completion of the modifications discussed in LRA Appendix F and the January 31, 2005, letter, the CLB for Unit 1 will be the same as Units 2 and 3. The review of LRA Appendix F regarding Unit 1 restart will be addressed in SER Section 2.6.1.1. Therefore, the staff's concern described in RAI F 2.3.4.1-1 is resolved.

In RAI F 2.3.4.1-2, the staff stated that license renewal drawings 2-47E801-2, 2-47E807-2, 3-47E801-2, and 3-47E807-2 highlight certain main steam system components for Units 2 and 3 associated with the reactor feed pump turbine drivers, the steam air ejector subsystem, and the steam seal regulator subsystem as being within the scope of license renewal and subject to an AMR. The corresponding components for Unit 1 should likewise be subject to an AMR. However, the drawings that show these components, such as license renewal drawings 1-47E801-2 (shown as a continuation line on drawing 1-47E801-1) and 2-47E807-2 and 3-47E807-2 (the corresponding drawings for Unit 1) are not provided. As a result, the staff was unable to determine if all of the aforementioned Unit 1 components, that are within the scope of license renewal and subject to an AMR for Units 2 and 3 were identified. Therefore, the staff requested that the applicant provide license renewal drawing 1-47E801-2 and the Unit 1 drawing that corresponds to drawings 2-47E807-2 and 3-47E807-2.

In its response, by letter dated October 25, 2004, the applicant stated that the license renewal drawings depict components subject to an AMR based on the units' CLB. As documented in LRA Appendix F.1, the Unit 1 CLB for MSIV leakage does not incorporate an alternate leakage treatment pathway utilizing the main steam piping and main condenser. Appendix F.1 identifies the activities required to be completed in order to make the subject licensing basis applicable to Unit 1. Since activities required by LRA Appendix F.1 are not complete, the piping/components of the subject system are not subject to an AMR at this time.

The applicant further stated that at this time the modification to implement this change into the plant for Unit 1 has not been implemented. Therefore, the piping for Unit 1 does not perform the alternate leakage pathway function. The applicant further stated that once the modification has been implemented in the plant, Unit 1 license renewal drawings addressed in the RAI will be added to the application and submitted during the annual update with the same components on Unit 1 requiring an AMR as those shown on the Unit 2 and Unit 3 license renewal drawings.

Based on its review, the staff found the applicant's response to RAI 2.3.4.1-2 acceptable. It clarifies that the Unit 1 CLB for MSIV leakage does not incorporate an alternate leakage treatment pathway utilizing main steam piping and the main condenser since the activities (identified in LRA Appendix F.1) required to make the Unit 1 CLB for MSIV leakage the same as that for Units 2 and 3 is not subject to an AMR at this time. The applicant also clarifies that once the modification is implemented, Unit 1 license renewal drawings will be submitted with the same components on Unit 1 that require an AMR as those shown on the Unit 2 and Unit 3 license renewal drawings. The review of LRA Appendix F regarding Unit 1 restart will be addressed in SER Section 2.6.1.1. Therefore, the staff's concern described in RAI 2.3.4.1-2 is resolved.

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments which support secondary containment, the applicant expanded the system boundaries for the main steam system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components outside secondary containment required to maintain the structural integrity of secondary containment that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for secondary containment qualification. In the enclosure to its letter dated May 31, 2005, the applicant stated that additional piping, fittings, and valves had been added to scope. However, the component types do not differ from those listed in LRA Table 2.3.4.1; therefore, no changes to the main steam system portion of the LRA are required.

The staff reviewed the NSR piping segments and found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components

#### 2.3.4.1.3 Conclusion

The staff reviewed the LRA, the accompanying scoping boundary drawing, and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its

review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the MS system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the MS system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.4.2 Condensate and Demineralized Water System**

#### **2.3.4.2.1 Summary of Technical Information in the Application**

In LRA Section 2.3.4.2, the applicant described the condensate and demineralized water system. The main system is the condensate system which provides treated water at required flow rates for the FW system during normal plant operation. The system is unique to each unit and the individual systems do not share components with one another. The turbine-generator condenser provides a heat sink for the closed-loop steam cycle and removes non-condensable gases. In addition, impurities are removed by a full-flow demineralizer system. The system also cools the steam jet air ejector intercondenser, the off-gas condenser, and the steam packing exhauster condenser. The condenser is credited in analyses for MSIV alternate leakage treatment.

Subsystems of the condensate system are the condensate storage and transfer system, for radioactive high purity water, and the demineralized water system, for non-radioactive high purity water. The tanks also provide a surge volume for flow testing of HPCI, RCIC, and CS systems. The condensate water storage tanks and the demineralized water storage tank provide high purity water for miscellaneous makeup uses throughout the plant, which includes the reactor building.

The condensate and demineralized water system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the condensate and demineralized water system could prevent the satisfactory accomplishment of an SR function. In addition, the condensate and demineralized water system performs functions that support fire protection, and SBO.

The intended functions within the scope of license renewal include the following:

- provides a normally open water supply to the RHR system piping flow path, which continues to the HPCI system piping that is located up-stream of the HPCI system pump
- provides primary and secondary containment boundaries
- provides a water supply for both HPCI and RCIC systems during an SBO
- retains fission products by plateout on a surface
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.4.2, the applicant identified the following condensate and demineralized water system component types that are within the scope of license renewal and subject to an AMR: bolting, condenser, expansion joint, fittings, piping, pumps, restricting orifice, tanks, tubing, and valves.

#### 2.3.4.2.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.2 and UFSAR Sections 10.13, 11.8, 11.9, F.6.10, and F.6.18 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments that support secondary containment, the applicant expanded the system boundaries for the condensate and demineralized water system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components outside secondary containment required to maintain the structural integrity of secondary containment that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for secondary containment qualification. In the enclosure to the May 31, 2005 letter, the applicant stated that additional piping, fittings, valves, and the demineralized water tank have been added to scope. However, the component types do not differ from those listed in LRA Table 2.3.4.2; therefore, no changes to the condensate and demineralized water system portion of the LRA are required. The staff reviewed applicant's submittals and found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.4.2.3 Conclusion

The staff reviewed the LRA and RAI response to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the condensate and demineralized water system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the condensate and demineralized water system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.4.3 Feedwater System**

#### **2.3.4.3.1 Summary of Technical Information in the Application**

In LRA Section 2.3.4.3, the applicant described the FW system. The FW system provides demineralized water at an elevated temperature to the reactor vessel during normal plant operations. FW is fed to the reactor vessel through six feedwater inlet nozzles. Suction for the system is drawn from the condensate system and FW is delivered to the reactor vessel at a controlled rate in order to maintain a stable reactor vessel water level. The system provides a flow path to the reactor vessel for the HPCI, RCIC, and RWCU systems.

The FW system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the FW system could prevent the satisfactory accomplishment of an SR function. In addition, the FW system performs functions that support fire protection, EQ, ATWS, and SBO.

The intended functions within the scope of license renewal include the following:

- provides RCPB
- provides primary and secondary containment boundaries
- provides a path for HPCI system flow to the reactor pressure vessel through the feedwater spargers
- provides an injection path for the RCIC system
- provides a pressure boundary of the FW system components connected to the control air system that must maintain a pressure boundary in support of supplying containment atmosphere dilution to the MSRVs
- restricts flow
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.4.3, the applicant identified the following FW component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, RCPB fittings, piping, RCPB piping, RCPB restricting orifice, tubing, valves, and RCPB valves.

#### **2.3.4.3.2 Staff Evaluation**

The staff reviewed LRA Section 2.3.4.3 and UFSAR Sections 3.7, 4.2, 4.7.5, 4.9, 4.11, 5.2.3, 5.3, 6.4.1, 7.2, 7.3, 7.4, 7.8, 7.10, 10.17, and 11.8 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant did not omit from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments that support secondary containment, the applicant expanded the system boundaries for the feedwater system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components outside secondary containment required to maintain the structural integrity of secondary containment that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2) for secondary containment qualification. In the enclosure to its letter dated May 31, 2005, the applicant stated that additional piping, valves, and heaters were added to scope. The component type, "heaters," was added to LRA Table 2.3.4.3.

The staff reviewed the NSR piping segments and found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components.

#### 2.3.4.3.3 Conclusion

The staff reviewed the LRA and RAI response to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the FW system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the FW system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.4.4 Heater Drains and Vents System**

##### 2.3.4.4.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.4, the applicant described the heater drains and vents system. The heater drains and vents system controls and contains the drains and vent paths from the various heaters associated with the main turbine cycle.

The heater drains and vents system contains SR components that are relied upon to remain functional during, and following, DBEs.

The intended functions within the scope of license renewal include the following:

- establishes an MSIV leakage pathway to the condenser
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.4.4, the applicant identified the following heater drains and vents system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, piping, traps, valves.

#### 2.3.4.4.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.4 and UFSAR Section 11.8 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.4.4, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued RAIs concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 2.3.4.4-1, the staff stated that pressure reducing valves PCV-1-151, -153, -166, and -167 are highlighted on license renewal drawing 2-47E801-2-LR as being within the scope of license renewal and subject to an AMR. However, the piping downstream of these pressure reducing valves is not within the scope of license renewal. Likewise, the similar arrangement for Unit 3 is shown on license renewal drawing 3-47E801-2-LR. Pressure reducing valves typically do not provide isolation capability if the downstream piping fails. Failure of the downstream piping could effect the intended function of the heater drains and vents system that is required to establish MSIV leakage pathway to the condenser per LRA Section 2.3.4.4. Therefore, the staff requested that the applicant provide a basis for excluding the piping downstream of valves PCV-1-151, -153, -166, and -167 from the scope of license renewal and from being subject to an AMR.

In its response, by letter dated October 19, 2004, the applicant stated that a calculation issued in support of the MSIV leakage path listed these valves as a boundary. These pressure reducing valves close on loss of power, loss of air, and low steam line pressure. The applicant stated that TVA will review the qualification of the MSIV leakage path to identify the piping,

supports and other components past the isolation valve required to maintain the structural integrity of the MSIV leakage pathway.

In a supplemental response dated May 31, 2005, the applicant provided the results of its review of the seismic qualification of the MSIV leakage path. As a result of the review, the following mechanical systems had systems boundary changes:

- main steam system
- auxiliary boiler system

However, the component types do not differ from those listed in the corresponding LRA tables; therefore, no changes to these systems' portion of the LRA are required.

The following mechanical systems had systems boundary changes; however, new component types were added that affected the scoping/screening results in the LRA.

- heaters drains and vents system
- off-gas system

The effect of these changes is evaluated and discussed in the corresponding sections of the SER. The remainder of the mechanical systems were not affected by this review.

Based on its review, the staff found the expanded scope of components to be acceptable, because the applicant had adequately included NSR components with the configurations that meet the scoping criterion of 10 CFR 54.4(a)(2) for the cases where NSR piping or components are directly connected to SR piping or components. Therefore, the staff's concern described in RAI 2.3.4.4-1 is resolved.

In RAI 2.3.4.4-2, the staff stated that check valves 742 and 744 are highlighted on license renewal drawing 2-47E801-2-LR as being within the scope of license renewal and subject to an AMR. However, the piping downstream of these check valves is not within the scope of license renewal. Likewise, the similar arrangement for Unit 3 is shown on license renewal drawing 3-47E801-2-R. Failure of the downstream piping would affect the intended function of the heater drains and vent system that is required to establish an MSIV leakage pathway to the condenser per LRA Section 2.3.4.4 and, therefore, should be within scope of license renewal as per 10 CFR 54.4(a)(2). Furthermore, the check valve orientation as shown on these drawings will not prevent flow to the downstream piping in the event of a failure. Therefore, the staff requested that the applicant provide a basis for excluding the piping downstream of check valves 742 and 744 from being subject to an AMR.

In its response, by letter dated October 19, 2004, the applicant stated that a calculation issued in support of the MSIV leakage path has these valves listed as a boundary. The applicant committed to review the qualification of the MSIV leakage path and identify the piping, supports and other components past the isolation valve required to maintain the structural integrity of the MSIV leakage pathway.

In a supplemental response dated May 31, 2005, the applicant stated that check valves 742 and 744 on boundary drawings 2-47E801-2-LR and 3-47E801-2-LR are spring-loaded and close on low pressure upon MSIV closure to prevent backflow through these valves.

Based on its review, the staff found the applicant's response to RAI 2.3.4.4-2 acceptable, because it adequately addressed the intended function of check valves 742 and 744. Failure of the downstream piping during low-pressure events will not impede the intended function of these check valves. Therefore, the staff's concern described in RAI 2.3.4.4-2 is resolved.

In order to resolve the 10 CFR 54.4(a)(2) issues discussed in RAI 2.1-2A(1) and (2) of SER Section 2.1 related to NSR piping segments that support the MSIV leakage path, the applicant expanded the system boundaries for the heaters drains and vents system. By letter dated May 31, 2005, the applicant submitted the results of its review of piping, supports, and other components required to maintain the structural integrity of the MSIV leakage path that are within the scope of license renewal in accordance with the requirements of 10 CFR 54.4(a)(2). In the enclosure to the May 31, 2005 letter, the applicant stated that additional piping had been added to scope. However, the component type does not differ from those listed in LRA Table 2.3.4.4; therefore, no changes to the heater drains and vents system portion of the LRA are required. The staff reviewed the NSR piping segments and found the expanded scope of components to be acceptable because the applicant had adequately included NSR components with the configuration that meets the scoping criterion of 10 CFR 54.4(a)(2) for the case where NSR piping or components are directly connected to SR piping segments.

#### 2.3.4.4.3 Conclusion

During its review of the information provided in the LRA, license renewal drawings, RAI responses, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the components of the heater drains and vents system. Therefore, the staff concludes the heater drains and vent system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant had adequately identified the heater drains and vents system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.4.5 Turbine Drains and Miscellaneous Piping System**

##### 2.3.4.5.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.5, the applicant described the turbine drains and miscellaneous piping system. The turbine drains and miscellaneous piping system directs controlled leakage from various MS system components into the condenser.

The turbine drains and miscellaneous piping system contains SR components that are relied upon to remain functional during, and following, DBEs.

The intended functions within the scope of license renewal include the following:

- establishes an MSIV leakage pathway to the condenser
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.4.5, the applicant identified the following turbine drains and miscellaneous piping system component types that are within the scope of license renewal and subject to an AMR: bolting and valves.

#### 2.3.4.5.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.5 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.4.5, the staff identified an area in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated October 8, 2004, the staff issued an RAI concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAI and the applicant's response.

In RAI F 2.3.4.5-1, the staff stated that LRA Section 2.3.4.5 states that the intended function of the turbine drains and miscellaneous piping system is to establish MSIV leakage pathway to the condenser. The entire LRA section is enclosed in a bold text box. LRA Appendix F, Section F.1, "Main Steam Isolation Valve Alternate Leakage Treatment," states that the Unit 1 main steam piping from the outermost isolation valve up to the turbine stop valve, the bypass/drain piping to the main condenser, and the main condenser is being evaluated and modified as required to ensure that the structural integrity is retained during, and following, an SSE. However, it is not clear where the alternate leakage treatment flow path to the condenser exists on license renewal drawings 2-47E807-2-LR and 3-47E807-2-LR. Therefore, the staff requested that the applicant identify which portions of these drawings show components that are part of the leakage pathway to the condenser.

In its response, by letter dated October 25, 2004, the applicant stated that the alternate leakage path ensures that process lines containing steam have a boundary that contains an isolation point to form a preferred leakage path to the condenser. The boundary was established at the first closed valve or fails-closed valve on the red lines continuing from LR drawings 2-47E801-2-LR, 2-47E807-1-LR, 3-47E801-2-LR, and 3-47E807-1-LR.

Based on its review, the staff found the applicant's response to RAI F 2.3.4.5-1 acceptable. It adequately identifies the portions of the license renewal drawings showing components that are part of the leakage pathway to the condenser. Therefore, the staff's concern described in RAI F 2.3.4.5-1 is resolved.

#### 2.3.4.5.3 Conclusion

The staff reviewed the LRA, the accompanying scoping boundary drawings, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the turbine drains and miscellaneous piping system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the turbine drains and miscellaneous piping system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.4.6 Condenser Circulating Water System**

##### 2.3.4.6.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.6, the applicant described the condenser circulating water system. Each unit contains a condenser circulating water system that does not share any components with the other units' systems. Each unit has three circulation water pumps that take water from a common intake channel in Wheeler Reservoir. After passing through the condensers, the heated water is cooled by the cooling towers or discharged directly back to Wheeler Reservoir. Provisions, including a loop in the discharge conduit with a vacuum breaker, are made for the prevention of the backflow of heated water into the intake channel, which serves as the ultimate heat sink, if normal offsite power is lost. One condenser circulating water pump has more than enough capacity to dissipate the shutdown heat for all three of the units.

The condenser circulating water system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the condenser circulating water system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides a manual vacuum breaking capability to prevent backflow from cooling tower warm channel into the forebay upon trip of the condenser circulating water pumps
- provides mechanical closure
- provides structural support

In LRA Table 2.3.4.6, the applicant identified the following condenser circulating water system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, piping, strainers, tubing, and valves.

##### 2.3.4.6.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.6 and UFSAR Sections 2.4.2.2.2, 11.6, 12.2.7, and F.6.4 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed the components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

In reviewing LRA Section 2.3.4.6, the staff identified areas in which additional information was necessary to complete the evaluation of the applicant's scoping and screening results. Therefore, by letter to the applicant dated August 31, 2004, the staff issued RAIs concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following paragraphs describe the staff's RAIs and the applicant's related responses.

In RAI 2.3.4.6-1, the staff stated that LRA Section 2.3.4.6 indicates that a vacuum-breaker valve, located in a piping loop in the discharge conduit of the condenser circulating water (CCW) system, is provided to prevent the backflow of heated cooling tower effluent from the warm water channel into the intake channel which serves as an ultimate heat sink. Backflow can occur upon loss of offsite power with attendant trip of the CCW pumps if the level in the warm water channel exceeds that in the intake channel. As indicated in the LRA, the components comprising this vacuum breaking subsystem require an AMR.

On the license renewal boundary drawings for Unit 1, all components comprising this subsystem are shown within the scope of license renewal in accordance with 10 CFR 54.4(a)(1). However, the drawings for Units 2 and 3 show only the vacuum-breaker valves themselves in scope under 10 CFR 54.4(a)(1), while the associated loop piping and fittings are shown either within scope under 10 CFR 54.4(a)(2) or else outside of scope. Therefore, the staff requested that the applicant justify why the components comprising this subsystem had been classified differently for Units 2 and 3 than for Unit 1.

In its response, by letter dated October 19, 2004, the applicant stated that DCN 51360A was issued to reclassify the loop piping and fittings of the above-mentioned subsystem from SR to NSR, for all three units. However, at the time of the LRA submittal, implementation of this DCN had been completed for Units 2 and 3 but not for Unit 1. This resulted in the differences in classification noted above. Additionally, the applicant stated that the above referenced loop components for Units 2 and 3, which are classified as outside the scope of license renewal, should have been classified as within scope under 10 CFR 54.4(a)(2). This error will be corrected on the drawings for Units 2 and 3. It was further noted that, since DCN 51360A has now been completed for Unit 1, the drawings for this unit have been revised to be consistent with those for Units 2 and 3 and will be resubmitted as part of the annual update.

Based on its review, the staff found the applicant's response to RAI 2.3.4.6-1 acceptable. The differences in component classification noted above have been satisfactorily explained and the corresponding drawings have been appropriately corrected. Therefore, the staff's concern described in RAI 2.3.4.6-1 is resolved.

In RAI 2.3.4.6-2, the staff stated that components of the CCW system that are subject to an AMR are shown in LRA Table 2.3.4.6. These components described in RAI 2.3.4.6-1 comprise the vacuum breaking subsystem. For the components listed, the table shows that structural support is the sole intended function for each (except bolting which has the additional intended function of mechanical closure). However, it would appear that the pressure boundary of the components comprising this subsystem must remain intact to effect a break in vacuum. Accordingly, each of these components should have the additional intended function of pressure boundary. Therefore, the staff requested that the applicant justify why the intended function pressure boundary is not included in LRA Table 2.3.4.6 for each of the components listed.

In its response, by letter dated October 19, 2004, the applicant stated that maintaining an intact pressure boundary for the components listed in LRA Table 2.3.4.6 is not required, because the vacuum-breaking valve in this subsystem could perform its intended function, even if leakage were to occur in the associated piping or fittings.

Based on its review, the staff found the applicant's response to RAI 2.3.4.6-2 acceptable. It adequately explains why the intended function of pressure boundary is not required for the components in question. Therefore, the staff's concern described in RAI 2.3.4.6-2 is resolved.

#### 2.3.4.6.3 Conclusion

The staff reviewed the LRA, the accompanying scoping boundary drawings, and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the condenser circulating water system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the condenser circulating water system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.4.7 Gland Seal Water System**

#### 2.3.4.7.1 Summary of Technical Information in the Application

In LRA Section 2.3.4.7, the applicant described the gland seal water system. The gland seal water system provides pressurized sealing water to the condenser and condensate system components that are under a vacuum in order to prevent air leakage into the condenser. Each individual system has an elevated gland seal tank that is located in the reactor building and also contains the associated piping that maintains a static pressure on seals (e.g., packing) of components of the main condenser and condensate systems that are under a vacuum during normal plant operations.

The gland seal water system contains SR components that are relied upon to remain functional during, and following, DBEs. The failure of NSR SSCs in the gland seal water system could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides a secondary containment boundary
- provides mechanical closure
- provides pressure boundary
- provides structural support

In LRA Table 2.3.4.7, the applicant identified the following gland seal water system component types that are within the scope of license renewal and subject to an AMR: bolting, fittings, piping, tanks, tubing, and valves.

#### 2.3.4.7.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.7 using the evaluation methodology described in SER Section 2.3. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.3.4.7.3 Conclusion

The staff reviewed the LRA to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the gland seal water system components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the gland seal water system components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

## **2.4 Scoping and Screening Results: Structures**

This section documents the staff's review of the applicant's scoping and screening results for structures. Specifically, this section discusses the following structures:

- boiling water reactor containment structures
- Class I Group 2 structures
- Class I Group 3 structures
- Class I Group 6 structures
- Class I Group 8 structures
- Class I Group 9 structures
- non-Class I structures
- structures and component supports commodities

In accordance with the requirements of 10 CFR 54.21(a)(1), the applicant must identify and list passive, long-lived structural SSCs that are within the scope of license renewal and subject to an AMR. To verify that the applicant properly implemented its methodology, the staff focused its review on the implementation results. This approach allowed the staff to confirm that there were no omissions of structures and components that meet the scoping criteria and are subject to an AMR.

Staff Evaluation Methodology. The staff's evaluation of the information provided in the LRA was performed in the same manner for all structures. The objective of the review was to determine if the components and supporting structures for a specific structure that appeared to meet the scoping criteria specified in the Rule had been identified by the applicant as within the scope of license renewal, in accordance with 10 CFR 54.4. Similarly, the staff evaluated the applicant's screening results to verify that all long-lived, passive components were subject to an AMR in accordance with 10 CFR 54.21(a)(1).

Scoping. To perform its evaluation, the staff reviewed the applicable LRA section and associated component drawings, focusing its review on components that had not been identified as within the scope of license renewal. The staff reviewed relevant licensing basis documents, including the UFSAR, for each structure and component to determine if the applicant had omitted components with intended functions delineated under 10 CFR 54.4(a) from the scope of license renewal. The staff also reviewed the licensing basis documents to determine if all intended functions delineated under 10 CFR 54.4(a) were specified in the LRA. If omissions were identified, the staff requested additional information to resolve the discrepancies.

Screening. Once the staff completed its review of the scoping results, the staff evaluated the applicant's screening results. For those structures and components with intended functions, the staff sought to determine if the functions are performed with moving parts or a change in configuration or properties, or if they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1). For those that did not meet either of these criteria, the staff sought to confirm that these structures and components were subject to an AMR as required by 10 CFR 54.21(a)(1). If discrepancies were identified, the staff requested additional information to resolve them.

## **2.4.1 Boiling Water Reactor Containment Structures**

### **2.4.1.1 Primary Containment Structure**

#### **2.4.1.1.1 Summary of Technical Information in the Application**

In LRA Section 2.4.1.1, the applicant described the primary containment structure. The primary containment structure is a General Electric Mark I containment design. Each unit has a primary containment structure that is completely enclosed within the unit's reactor building. The main function of the primary containment structure is to limit the release of fission products to the environment in the event of a design-basis LOCA.

The primary containment consists of a drywell, pressure suppression chamber, and a connecting vent system. The drywell is a steel pressure vessel enclosed in reinforced concrete. The drywell contains the reactor vessel, reactor recirculation system, and portions of other systems that form the reactor coolant pressure boundary. Also included within the drywell are structural steel framing, electrical and mechanical equipment and system supports, a concrete shield wall around the reactor vessel, a removable steel head, a personnel airlock with two mechanically interlocked doors, two equipment hatches, and miscellaneous electrical and mechanical penetrations. The pressure suppression chamber is a steel, toroidal-shaped pressure vessel. The pressure suppression chamber is commonly referred to as the "torus." The torus includes internal steel framing, vent header, supports, access hatches, and penetrations. The torus is mounted on support structures that transmit loads to the concrete foundation of the reactor building. The drywell is connected to the pressure suppression chamber with eight equally spaced vent lines. These vent lines are connected to a header, which is contained within the air space of the pressure suppression chamber. The pressure suppression chamber contains a large pool of water that condenses the steam from a failure of the reactor coolant pressure boundary piping in the drywell. The pool also condenses steam from the main steam relief valve discharge, high pressure coolant injection, and reactor core isolation cooling turbine discharge.

The primary containment structure contains SR SSCs that are relied upon to remain functional during, and following, DBEs to ensure the integrity of the reactor coolant pressure boundary, shut down the reactor and maintain it in a safe shutdown condition, and prevent or mitigate the consequences of accidents that could result in potential offsite exposure. The failure of NSR SSCs in the primary containment structure could prevent the satisfactory accomplishment of an SR function. In addition, the primary containment structure performs functions that support fire protection, EQ, ATWS, and SBO.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for components relied upon to demonstrate compliance with fire protection, EQ, and ATWS regulated events
- provides structural support and shelter/protection for SR components, NSR components, and components relied upon to demonstrate compliance with the SBO regulated event

- limits and controls the release of fission products to the secondary containment during DBAs
- provides sufficient air and water volumes to absorb the energy released to the containment during DBAs
- provides a source of water to the emergency core cooling systems
- provides protection to personnel and components from radiation
- provides a pressure boundary
- shelters and protects a component from the effects of weather or localized environmental conditions
- reduces a radiation dose
- provides structural and functional support for structures and components that are within the scope of license renewal

In LRA Table 2.4.1.1, the applicant identified the following primary containment structure component types that are within the scope of license renewal and subject to an AMR:

- caulking and sealants
- compressible joints and seals
- controlled leakage doors
- hatches/plugs
- high density shielding concrete
- electrical and I&C penetrations
- mechanical penetrations
- reinforced concrete beams, columns, walls, and slabs
- steel containment elements
- structural bellows
- structural steel beams, columns, plates, and trusses

#### 2.4.1.1.2 Staff Evaluation

The staff reviewed LRA Section 2.4.1.1 and UFSAR Sections 5.2, 12.2.2 and C.5 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.1.1 identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

In RAI 2.4-2, dated December 20, 2004, the staff stated that in reviewing LRA Section 2.4.1.1, it noted that this section of the LRA should address not only the primary containment (drywell, pressure suppression chamber, and the vent system connecting the two structures), but also all the structures inside the primary containment, all attachments to the containment, and the containment supports. The staff also noted that LRA Table 2.4.1.1 identified the primary containment component types requiring AMR and the associated component intended function(s). Since LRA Table 2.4.1.1 combined many components under a single component type, the staff requested that the applicant identify which component type had been intended to cover the specific components listed in (a) through (k) below, or to identify the location in the LRA where these specific components had been addressed. If these specific components had not been considered to be within the scope of license renewal, the applicant was requested to provide the technical bases for their exclusion.

- a. reactor vessel to biological shield stabilizers
- b. biological shield to containment stabilizer
- c. reactor pressure vessel (RPV) male stabilizer attached to outside of drywell shell
- d. RPV female stabilizer and anchor rods (also referred to as gib) embedded in reactor building concrete wall
- e. biological shield wall and anchor bolts
- f. reactor vessel support skirt and anchor bolts
- g. reactor vessel support ring girder and anchor bolts
- h. reactor vessel support pedestal
- i. drywell internal steel shear ring
- j. drywell steel support skirt and anchor bolts
- k. drywell head closure bolts and double gasket, tongue-and-groove seal arrangement

By letter dated January 24, 2005, the applicant provided the following response:

The Primary Containment Structure scoping and screening results are presented in LRA Section 2.4.1.1, the Reactor Vessel scoping and screening results are presented in LRA Section 2.3.1.1, and the Structures and Component Supports Commodity Group scoping and screening results are presented in LRA Section 2.4.8.1. The following list of components roll-up to the listed component groups:

(a) Reactor Vessel to Biological Shield Stabilizers:

- Table 2.4.8.1, ASME Equivalent Supports and Components;
- Table 3.5.2.26, ASME Equivalent Supports and Components;
- Table 2.3.1.1, Stabilizer Bracket;
- Table 3.1.2.1, Stabilizer Bracket; and
- LRA Section 3.1.2.2.16.1 BWRVIP-74-A Table 4-1 Items.
- NOTE: This biological shield wall is internal to the drywell.

- (b) Biological Shield to Containment Stabilizer:
- Table 2.4.1.1, Steel Containment Elements; and
  - Table 3.5.2.1, Steel Containment Element.
  - NOTE: This biological shield wall is internal to the drywell.
- (c) RPV Male Stabilizer Bracket Attached to Outside of Drywell Shell:
- There is no RPV male stabilizer bracket attached to the outside of the Drywell shell at BFN. There is a stabilizer from the internal biological shield wall to the inside containment shell that is a subset of biological shield to containment stabilizer noted in (b) above.
- (d) RPV Female Stabilizer and Anchor Rods (also referred to as Gib) embedded in Reactor Building concrete wall:
- There is no RPV female stabilizer and anchor rods (also referred to as Gib) embedded in Reactor Building concrete wall at BFN. There is a female stabilizer and anchor rods assembly embedded in Reactor Building concrete wall (also a biological shield wall external to Drywell) and is a subset of biological shield to containment stabilizer noted in (b) above.
- (e) Biological Shield Wall and Anchor Bolts:
- Table 2.4.1.1, High Density Shielding Concrete;
  - Table 3.5.2.1, High Density Shielding Concrete (Un-reinforced shielding concrete is encased between steel plates and is inaccessible. The steel plates are included with structural steel internal to drywell);
  - Table 2.4.1.1, Structural Steel Beams, Columns, Plates, Trusses; and
  - Table 3.5.2.1, Structural Steel Beams, Columns, Plates, Trusses.
  - NOTE: This biological shield wall is internal to the drywell.
- (f) Reactor Vessel Support Skirt and Anchor Bolts:
- Table 2.3.1.1, Support Skirt and Attachment Welds;
  - Table 3.1.2.1, Reactor Vessel Support Skirt and Attachment Welds;
  - LRA Section 3.1.2.2.16.1 BWRVIP-74-A Table 4-1 Items;
  - Table 2.4.8.1, ASME Equivalent Supports and Components; and
  - Table 3.5.2.26, ASME Equivalent Supports and Components (includes anchor bolts).

- (g) Reactor Vessel Support Ring Girder and Anchor Bolts:
- Table 2.4.8.1, ASME Equivalent Supports and Components; and
  - Table 3.5.2.26, ASME Equivalent Supports and Components (includes anchor bolts).
- (h) Reactor Vessel Support Pedestal:
- Table 2.4.1.1, Reinforced Concrete Beams, Columns, Walls, and Slabs; and
  - Table 3.5.2.1, Reinforced Concrete Beams, Columns, Walls, and Slabs.
- (i) Drywell Internal Steel Shear Ring:
- BFN does not have a "Drywell Internal Steel Shear Ring"
- (j) Drywell Steel Support Skirt and Anchor Bolts:
- Table 2.4.1.1, Steel Containment Elements; and
  - Table 3.5.2.1, Steel Containment Elements (Drywell steel support skirt is part of the Class MC drywell support and the skirt and anchor bolts are encased in concrete; therefore, they are inaccessible.)
- (k) The Drywell Head Closure Bolts and Double Gasket, Tongue and Groove Seal Arrangement:
- Table 2.4.1.1, Steel Containment Elements;
  - Table 3.5.2.1, Steel Containment Elements (Includes drywell head closure bolts);
  - Table 2.4.1.1, Compressible Joints & Seals; and
  - Table 3.5.2.1, Compressible Joints & Seals.

Based on the response to RAI 2.4-2 by letter dated January 24, 2005, the staff found that the components identified in the RAI are covered under the scope of LRA Section 2.4.1, except item (f), which is covered under the scope of LRA Section 2.3. However, 10 CFR 54.4(a) and (b) require identification of all in-scope structures and components and their intended functions. The staff reviewer assumed that the drywell and suppression chamber supports (items (j) and (k)) are within the scope of license renewal; however, an absence of all structural components internal to drywells and suppression chambers (Items (a) to (e), and items (g) and (h)) from LRA Table 2.4.1.1 implies that they are not within the scope of license renewal. The applicant was requested to explicitly incorporate the components internal to drywells and suppression chambers within the scope of license renewal, through cross referencing, if necessary.

In a follow-up response to RAI 2.4-2, by letter dated May 24, 2005, the applicant stated that the methodology used to determine the components within the scope of license renewal is described in LRA Section 2.1.4.3.3, "Structural Component Scoping," and reads as follows:

For structures determined to be within the scope of 10 CFR 54, detailed structural drawings were reviewed to identify structural components (such as structural steel, foundations, floors, walls, ceilings, penetrations or stairways). For in-scope structures, all structural components that are required to support the intended functions of the structure were identified as in-scope of 10 CFR 54. These structural components were generally evaluated as generic structural commodities, not as individual components.

LRA Section 2.4.1.1 addresses the primary containment structure and includes all component types, as noted in LRA Table 2.4.1.1. The component type "Reinforced Concrete Beams, Columns, Walls, and Slabs" includes the concrete of the reactor vessel support pedestal and other structural concrete located within the primary containment structure. The component type "High Density Shielding Concrete" includes the concrete of the biological shield wall. The component type "Structural Steel Beams, Columns, Plates, Trusses" includes the plates that form the cylindrical shell of the biological shield wall and other structural steel components such as the steel platforms located within the primary containment structure. The component type "Steel Containment Elements" includes the stabilizers between the biological shield wall and containment shell, RPV male stabilizer bracket and RPV female stabilizer and anchor bolts, drywell, drywell steel support skirt and anchor bolts, drywell head and closure bolts, torus and torus ring girder, embedded steel, and other components that comprise the primary containment boundary of the primary containment structure. The component type "Compressible Joints and Seals" includes the gasket material used in the drywell head seal, drywell and torus access hatch seals, and personnel access doors and penetration seals located in the primary containment structure. Components identified as supports that are located within the primary containment structure were addressed in Section 2.4.8.1, Structures and Component Supports Commodity Group. The component type "ASME Equivalent Supports and Components" includes the anchor bolts of the RPV support skirt, RPV ring girder and anchor bolts and other supports for ASME Code Class 1 and Class 2 piping within the primary containment structure.

Based on this detailed description of the commodity groups that are included within the scope of license renewal, the staff found that all structural as well as non-structural (e.g., seals and gaskets) components within the primary containment structures have been included within the scope of license renewal. Therefore, the staff found the applicant's scoping of the components within the primary containment acceptable, and the staff's concern described in RAI 2.4-2 is resolved.

In RAI 2.4-3, dated December 20, 2004, the staff explained its concern that leakage through the refueling seals located at the top of the drywell potentially exposes the carbon steel drywell shell inner and outer surfaces to loss of material due to corrosion. This is a particular concern for the embedded portion of the drywell shell. Corrosion detected on the outer shell surface in the sand pocket region in a number of Mark I steel containments has been attributed to leakage past the drywell-to-reactor building refueling seal, coupled with clogging of the sand pocket drains. Leakage into the drywell past the reactor vessel-to-drywell refueling seal creates the potential for corrosion of the inaccessible portion of the inner surface of the drywell shell embedded in the concrete floor.

From the information contained in the LRA, the staff stated that it was not clear (1) whether the refueling seals had been included within the scope of license renewal, and (2) if included, how aging management of the seals was addressed. Therefore, the staff requested the applicant to

verify that the BFN plants' refueling seals were included in a component type that required an AMR, or a detailed explanation for their exclusion. The staff also requested the applicant to provide a detailed description of the plant-specific operating experience for the refueling seals in all three 3 units, including incidences of degradation, method of detection, root cause, corrective actions, and current inspection procedures.

In its response, by letter dated January 24, 2005, the applicant stated that BFN it had not included the refueling seals at the top of the drywell within the scope of license renewal, and explained its logic as follows:

The performance of the drywell-to-reactor building refueling seal is not considered a safety-related function. The drywell to reactor building refueling seal and the reactor pressure vessel (RPV)-to-drywell refueling seal, in conjunction with the refueling bulkhead, provides a watertight barrier to permit flooding above the RPV flange while preventing water from entering the drywell. Providing a watertight barrier to permit flooding above the RPV flange in support of refueling operations is not a safety-related function.

Moreover, the applicant stated that the performance of the drywell-to-reactor building refueling seal is not considered a II over I issue by quoting 10 CFR 54.4(a)(2): "All non safety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this section," and provided the following explanation:

A postulated failure of the drywell-to-reactor building refueling seal can result in water intrusion into the annulus space around the drywell. This leakage can occur only during refueling outages when the reactor cavity is flooded to allow movement of fuel between the reactor and the fuel pool. However, water intrusion does not cause failure of the drywell's intended function. Any water leakage resulting from a postulated failure of the drywell-to-reactor building refueling seal could not remain suspended in the annulus region for an indefinite period of time and would eventually be routed to the sand-pocket area drains or would evaporate due to the heat generated in the drywell during operation.

The staff disagreed with the applicant's rationale for not including the reactor building-to-drywell refueling seals within the scope.

In OI 2.4-3, the staff explained that Supplement 1 of IE IN 86-99 indicates that if leakage from the flooded reactor cavity is not monitored and managed, there is a potential for corrosion of the cylindrical portion of the drywell shell. As this corrosion would initiate in the non-inspectible areas of the drywell, it cannot be monitored by IWE inspections. Moreover, this degradation of the drywell shell can occur even if there is very little water found in the sand pocket area of the drywell. Thus, the reactor building-to-drywell refueling seal becomes a nonsafety item, that can affect the integrity of the drywell shell (which is a pressure boundary component) during the period of extended operation, and falls under the requirement of 10 CFR 54.4(a)(2). Furthermore, the staff offered an alternative by citing two BWR plants where the staff had accepted in the past an alternative to managing the aging of the seal. The alternative is to periodically perform ultrasonic testing (UT) of the cylindrical portion of the drywell shell with an acceptable sampling program, as part of the containment ISI program. After reviewing the

response to RAI 3.5-4 (in the applicant's letter dated January 31, 2005) related to the operating experience of drywell shell corrosion at all three units of BFN, the staff came to the conclusion that the applicant should manage the aging (leakage) of refueling seals. The applicant was requested to include the refueling seals within the scope of license renewal.

In its response, by letter dated May 31, 2005, the applicant emphasized that BFN does not include the refueling seals at the top of the drywell in the scope of license renewal and provided the following technical basis for that conclusion:

The drywell-to-reactor building refueling seal and the reactor pressure vessel (RPV)-to-drywell refueling seal, in conjunction with the refueling bulkhead, provide a watertight barrier to permit flooding above the RPV flange while preventing water from entering the drywell. Providing a watertight barrier to permit flooding above the RPV flange in support of refueling operations is not a safety-related function. 10 CFR 54.4(a) sets forth the criteria that determine whether plant systems, structures, and components are within the scope of license renewal. The refueling seals do not satisfy any of the requirements set forth in 10 CFR 54.4(a)(1). The refueling seals are not safety related and they are not relied upon to remain functional during design basis events to ensure 10 CFR 54.4(a)(1)(i) the integrity of the reactor coolant pressure boundary, 10 CFR 54.4(a)(1)(ii) the capability to shut down the reactor and maintain it in a safe shutdown condition, or 10 CFR 54.4(a)(1)(iii) the capability to prevent or mitigate potential offsite exposures comparable to those referred to in 10 CFR 50.34(a)(1), 50.67(b)(2), or 100.11. Thus, the refueling seals are not brought into scope of license renewal by 10 CFR 54.4(a)(1).

Additionally, the applicant stated that the performance of the drywell-to-reactor building refueling seal and the RPV-to-drywell refueling seal, in conjunction with the refueling bulkhead is not considered a II over I issue. 10 CFR 54.4(a)(2) states, "All non-safety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this section." A postulated failure of the drywell-to-reactor building refueling seal can result in water intrusion into the annulus space around the drywell. This leakage can occur only during refueling outages when the reactor cavity is flooded to allow movement of fuel between the reactor and the fuel pool. However, water intrusion does not cause failure of the drywell's intended function. Any water leakage resulting from a postulated failure of the drywell-to-reactor building refueling seal could not remain suspended in the annulus region for an indefinite period of time and would eventually be routed to the sand pocket area drains or would evaporate due to the heat generated in the drywell during operation. The refueling seals are not relied upon in safety analyses or plant evaluations to perform a function that demonstrates compliance with the NRC regulations for fire protection, EQ, PRS (N/A for BWRs), ATWS, or SBO. The applicant discussed in detail the differences between condition of the BFN units and that of Dresden 3, and emphasized that the BFN refueling seals are not within the scope of license renewal and do not require aging management review. The applicant also pointed out that Hatch Units 1 and 2 (NUREG-1803), Peach Bottom Units 2 and 3 (NUREG-1769) and Dresden Units 2 and 3 and Quad Cities 1 and 2 (NUREG-1796) did not identify refueling seals to be within the scope of license renewal. Thereafter, the applicant provided a detailed description of the BFN steel shell inspections in the sand pocket areas (these are discussed in the staff's evaluation of RAI 3.5-4), and concluded: "Based on Browns Ferry scoping results, Browns Ferry operating experience, and

prior industry precedents, Browns Ferry refueling seals are not in the scope of license renewal, nor are additional drywell inspections warranted at Browns Ferry.”

Follow-up OI RAI 2.4-3 - In a detailed response to the staff’s follow-up item 3.5-4 related to the seal area near the drywell flange, by letter dated May 31, 2005, the applicant stated:

This area is exposed to standing water and repeated wetting and drying during refueling operations. The area is not accessible for detailed visual examination from the outside surface. There are no documented UT thickness measurements of this area. No previous problems have been documented relative to degradation of this area. Standing water was observed in this area during the April, 1998 Unit 3 mid-cycle outage, during a walkdown performed immediately following drywell head removal and prior to floodup. Since the true surface condition can not be determined by visual examination or review of existing data, this area appears to warrant additional investigation to determine whether it should be included for augmented examination.

In its response, the applicant also provided a description of the limited number of UT measurements taken. The staff expressed its belief that 10 CFR 54.4(a)(2) applies to the uninspectable side of the drywell shell, as significant corrosion of the drywell shell would jeopardize capability of the primary containment to prevent or mitigate the consequences of accidents as per 10 CFR 54.4(a)(1)(iii). Based on the applicant’s responses to RAI 2.4-3, and the follow-up RAI 3.5-4, the staff did not insist on having the drywell-to-reactor building seal within the scope of license renewal. However, the staff indicated that it needed assurance that the potential degradation of the uninspectable side of the drywell will be monitored and managed during the period of extended operation. This remained as OI 2.4-3.

In its letter dated November 16, 2005, the applicant explained that to provide the staff with the necessary assurance that the potential degradation of the uninspectable side of the drywell is being monitored and managed, the applicant will perform one-time confirmatory ultrasonic thickness measurements on a portion of the cylindrical section of the drywell in a region where the liner plate is 0.75 inches thick. These ultrasonic thickness measurements will be obtained at four locations, approximately 90° apart, in an area at least three feet by three feet with measurements taken at intersection points of approximately one-foot grids. This will provide a bounding condition since the nominal thickness of the wall in this region has the least margin. These ultrasonic thickness measurements will be obtained on Unit 2 and Unit 3 prior to the period of extended operation to provide added assurance that the integrity of the drywell shell is not being compromised by wastage before entering into the renewed licensing period.

For Unit 1, the applicant explained that it will perform one-time confirmatory ultrasonic thickness measurements on the vertical cylindrical area immediately below the drywell flange. This area is exposed to standing water and repeated wetting and drying during refueling operations. These ultrasonic thickness measurements will be obtained on the entire vertical portion of the liner accessible from inside drywell above elevation 637.0’ (Az 0° - Az 360°) with measurements taken at intersection points of approximately one-foot grids. These ultrasonic thickness measurements will be obtained prior to Unit 1 restart. Similar inspections have been performed on Units 2 and 3 in this area as documented in BFN plant procedure O-TI-376, Appendix 9.7. A discussion of the inspection for Units 2 and 3 is contained in the applicant’s response to follow-up RAI 3.5-4, page E-13 in the letter from TVA to the NRC dated May 31, 2005.

The applicant, further asserted that data from the ultrasonic thickness measurements described above will be reviewed by its engineering division. If any areas of concern or non-conforming conditions are identified, a PER will be initiated in accordance with the site Corrective Action Program, SPP-3.1. A corrective action plan will be developed in accordance with SPP-3.1 and an extent of condition and applicability to the other BFN units would be considered in the disposition of the PER.

As part of its response, the applicant emphasized that the BFN configuration of the refueling cavity-to-drywell seal is different from that of a number of other Mark I containments. There is no gasket at the drain, and the applicant claimed that it is able to monitor the leakage from the refueling seal, if it occurs. However, the applicant could not satisfactorily explain the root cause of water in the sand pocket areas. Therefore, the applicant chose to monitor the cylindrical inaccessible areas of the three BFN units. For Units 2 and 3, the applicant will perform an augmented inspection of these areas one time prior to the periods of extended operation; and, for Unit 1, it will perform the inspection of these areas prior to Unit 1 restart. As part of these inspections, if the applicant discovers non-conforming conditions, it will take appropriate corrective actions. After careful review of the applicant's commitments, the staff considered the approach proposed by the applicant acceptable; therefore, OI 2.4-3 is closed.<sup>1</sup>

#### 2.4.1.1.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the primary containment structure components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the primary containment structure components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### 2.4.2 Class 1 Group 2 Structures

In LRA Section 2.4.2, the applicant identified the structures and components of the Class 1 Group 2 structures that are subject to an AMR for license renewal.

The applicant described the supporting structures and components of the Class 1 Group 2 structures in the following sections of the LRA:

- 2.4.2.1 reactor buildings
- 2.4.2.2 equipment access lock

The corresponding subsections of the SER, 2.4.2.1 – 2.4.2.2, present the staff's review findings with respect to the Class 1 Group 2 structures for BFN.

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<sup>1</sup> The OI-2.3-3 was discussed in the ACRS 530<sup>th</sup> full committee meeting on March 9, 2006. Additional discussion on this OI is provided in SER supplement NUREG-xxxx.

### **2.4.2.1 Reactor Buildings**

#### **2.4.2.1.1 Summary of Technical Information in the Application**

In LRA Section 2.4.2.1, the applicant described the reactor buildings. Each unit has its own reactor building that completely encloses the reactors, the primary containment structures, and the auxiliary and emergency systems of the nuclear steam supply system (NSSS). A major substructure of the reactor building is the reinforced concrete biological shield that surrounds the drywell portion of the primary containment. The reactor buildings house features such as the spent fuel pool, steam dryer/moisture separator storage pool, reactor cavity, reactor auxiliary equipment, refueling equipment, reactor servicing equipment, and the control bay. The control bay houses the main control room that is required for plant operation and the operation of other important auxiliary systems. The reactor building consists of monolithic, reinforced concrete floors and walls from the foundation to the refueling floor. The refueling floor is common for all three units and is enclosed by the steel superstructure with metal siding and a built-up roof. Blowout or pressure relief panels are installed as part of the reactor building superstructure to relieve pressure during a DBA or DBE.

The reactor buildings contain SR components that are relied upon to remain functional during and following DBEs. The failure of NSR SSCs in the reactor buildings could prevent the satisfactory accomplishment of an SR function. In addition, the reactor buildings perform functions that support fire protection, EQ, ATWS, and SBO.

The intended functions within the scope of license renewal include the following:

- provides controls for the potential release of fission products to the external environment
- provides a secondary containment function when the primary containment is required to be in service
- provides a primary containment function during reactor refueling and maintenance operations when the primary containment systems are open
- provides radiation shielding protection for personnel, equipment, and components
- provides structural support and shelter/protection for components relied upon to demonstrate compliance with the fire protection, EQ, and ATWS regulated events
- provides structural support and shelter/protection for SR components, NSR components, and components relied upon to demonstrate compliance with the SBO regulated event
- provides protection for the safe storage of new and spent fuel
- prevents criticality of new and spent fuel
- allows for expansion of a component
- provides a rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant
- provides flood protection barrier for internal and external flooding events

- provides protection against the effects of a high-energy or low-energy (moderate) line break
- provides a barrier for protection against internally or externally generated missiles
- provides a pressure boundary
- shelters and protects a component from the effects of weather or localized environmental conditions
- reduces a radiation dose
- provides structural and functional support for structures and components within the scope of license renewal
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.2.1, the applicant identified the following reactor buildings component types that are within the scope of license renewal and subject to an AMR:

- bolting and fasteners
- caulking and sealants
- compressible joints and seals
- controlled leakage doors
- expansion joints
- fire barriers
- hatches and plugs
- masonry block
- metal roofing
- metal siding
- electrical and I&C penetrations
- mechanical penetrations
- reinforced concrete beams, columns, walls, and slabs
- roof membrane
- spent fuel pool liners
- spent fuel storage racks (includes new fuel storage racks)
- structural steel, beams, plates, and trusses

#### 2.4.2.1.2 Staff Evaluation

The staff reviewed LRA Section 2.4.2.1 and UFSAR Sections 5.3 and 12.2.2 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.2.1 identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff noted that LRA drawing 0-10E201-01-LR, "License Renewal Screening for Information Only Location of Structures," identifies structures that are not within scope of license renewal. These structures include east access facility, isolation valve pits, radwaste building, south access retaining walls, water and oil storage building, part of gate structure No.2 adjacent to diesel high-pressure fire pump house, raw water treatment facility, structural elements within the transformer yard, and other miscellaneous buildings. It was not clear to the staff that all of the above listed structures serve no intended function as defined in 10 CFR 54.4(a)(1).

In RAI 2.4-1, dated December 20, 2004, the staff asked the applicant to provide additional descriptive information for the above-listed structures, define their function, and describe the technical bases for exclusion from the license renewal scope. The applicant was also requested to verify that none of these structures serve a seismic II/I intended function as defined in 10 CFR 54.4(a)(2).

In its response, by letter dated January 24, 2005, the applicant stated the following:

These five (5) structures; East Access Facility, Radwaste Building, Water and Oil Storage Building, part of Gate Structure No.2 adjacent to Diesel High Pressure Fire Pump House, and Raw Water Treatment Facility are groups of Class II (NSR) structures and major civil features that do not satisfy the requirements of 10 CFR 54.4(a). These five structures provide structural support and anchorage for NSR equipment and equipment that is not required to support regulated events (ATWS, fire protection, EQ, and SBO). None of the five structures and major components in these structural groups serves a seismic II/I intended function. This was the technical basis for exclusion from the license renewal scope. A more detailed description and functions is provided below for each of the five structures. A more detailed description of the South Access Retaining Walls, the Isolation Valve Pits, and the structural elements within the Transformer Yard and other miscellaneous buildings is also provided below.

#### East Access Facility

This facility is a set of two temporary Class II (non-safety-related) buildings built originally to support the recovery of BFN unit 3. One building provides office space and shop area for site maintenance personnel. The other building provides access for site personnel, plant material and plant equipment into the powerhouse (through the unit 3 Turbine Building) and a radiation control point for same entering or exiting the unit 3 Turbine Building.

#### Isolation Valve Pits

These Class II (non-safety-related) structures are manholes that provide structural support and shelter protection for the hardened wetwell vent piping and components. Upon further review, it has been noted that the hardened wetwell vent is in scope for license renewal per section 2.3.2.1, Containment System (064). The hardened wetwell vent was a commitment to GL 89-16. These isolation valve pits are Class II (NSR) structures and since they provide an intended function for an in-scope mechanical

system (54.4(a)(2)), they should be included within the scope of the LRA. Refer to Attachment 1 for the affected sections of the application with the required scoping, screening and aging management review results for these structures (manholes).

#### Radwaste Building

The Radwaste Building is a Class II (non-safety-related) structure per UFSAR section 12.2.5. The Radwaste Building is a cellular box-type concrete structure extending approximately 20 feet below grade and 30 feet above grade and is supported by steel H-piles driven to bedrock. This building houses common services to all three units. The concrete structure provides shelter/protection and non-safety related structural support for equipment and components that support the processing of radwaste generated as a result of plant operation.

#### South Access Retaining Walls

These retaining walls are safety-related structural features that maintain the stability of the safety-related Earth Berm. The retaining walls provide retention of the Earth Berm and allows for removal of a portion of the earth berm to construct a temporary personnel access building. This temporary personnel access building provides access for site personnel into the unit 1 Reactor Building and a radiation control point for same entering or exiting the unit 1 Reactor Building during unit 1 recovery. These retaining walls are safety-related structural features and should be included in the LRA. Refer to Attachment 2 for the affected sections of the application with the required scoping, screening and aging management review results for this structural feature.

#### Water and Oil Storage Building

The Water and Oil Storage Building is a Class II (non-safety related) of light commercial construction, housing non-safety related electrical components and equipment for the non-safety related water and oil storage tanks located east of this building.

#### Part of Gate Structure No. 2 adjacent to Diesel HPFP House

Gate Structure No. 2 is part of the Auxiliary Condenser Cooling Water System as shown on UFSAR Figure 12.2-72a (TVA drawing 0-31E400-1). The system consists of waterways, control structures (i.e., Discharge Control Structure and Gate Structure No. 2) and cooling towers to permit helper system operation. They are seismically unclassified and were designed for normal applicable dead, live, and surcharge loads with appropriate load factors. The Diesel HPFP House is also a Class II structure and was determined to be in-scope for LR because it houses mechanical and electrical components that support the regulated event 50.48. Consequently seismic events do not have to be considered to occur with the regulated event 50.48.

#### Raw Water Treatment Facility

The Raw Water Treatment Facility is a Class II (non-safetyrelated) prefabricated facility housing non-safety-related equipment and tanks for chemical injection into the raw cooling and service water systems. The function of the facility is to provide shelter/protection and non-safety-related structural support for the equipment and

components in this facility. A small office space for transit personnel is provided in one of the buildings.

Structural Elements within the Transformer Yard and other miscellaneous buildings

The Transformer Yard is in the scope of license renewal based on the criteria of 54.4(a)(3) for Station Blackout. See LRA section 2.4.7.4 for Transformer Yard scoping and screening results. Note that the 161 kV Switchyard (LRA section 2.4.7.5) and the 500 kV Switchyard (LRA section 2.4.7.6) are also in the scope of license renewal based on the criteria of 54.4(a)(3) for Station Blackout. There are no permanent buildings within the license renewal boundary diagram for Transformer Yard or 161 kV Switchyard or 500 kV Switchyard.

The staff reviewed the above response including the Attachments 1 and 2 of the applicant's letter dated January 24, 2005. The applicant committed to include the structural components discussed in these attachments. The staff provided its evaluation of the structures for isolation valve pits and south access retaining walls discussed in SER Sections 2.4.7.7 and 2.4.3.9, respectively. The staff found that the response is adequate and acceptable. Therefore, the staff's concern described in RAI 2.4-1 is resolved.

In RAI 2.4-4, dated December 20, 2004, the staff stated that LRA Table 2.4.2.1 presents a list of component types that are part of the reactor building, the auxiliary and emergency systems of the NSSS, the biological shield, the spent fuel pool, the steam dryer/moisture separator storage pool, the reactor cavity reactor auxiliary equipment, the steel superstructure with metal siding and the built-up roof. Therefore, the staff requested the applicant to provide a description of the "Neutron-Absorbing Sheets" used for the spent fuel storage racks and confirm that they are part of the spent fuel storage racks listed in LRA Table 2.4.2.1.

In its response, by letter dated January 24, 2005, the applicant stated:

NUREG 1801, Section VII.A2.1-b, identifies "Spent Fuel Storage Racks – neutron absorbing sheets" as a component type. In BFN LRA Section 2.3.3.27 "Fuel Handling and Storage System (079)," it states that the spent fuel pool components are evaluated as structural components in Section 2.4.2.1 "Reactor Building Structure". BFN LRA Table 2.4.2.1 "Reactor Building Structure" identifies "Spent Fuel Storage Racks (includes new fuel storage racks)" as a component requiring aging management. The "Neutron Absorbing Sheet" is a component of the BFN spent fuel storage rack container tube wall and is comprised of Boral sandwiched within the stainless steel wall of each container tube.

The staff found the above response acceptable. Therefore, the staff's concern described in RAI 2.4-4 is resolved.

In RAI 2.4-5, dated December 20, 2004, referring to LRA Section 2.4.2.1, the staff requested the applicant to clarify if the reactor buildings are designed to maintain an internal negative pressure under neutral wind conditions in order to serve as the secondary containment whose primary purpose is to minimize the ground level release of airborne radioactive materials and to provide for a controlled, elevated release of the building atmosphere under accident conditions. If this assumption was correct, the staff wanted to know if reactor building pipe penetrations

were provided with some type of silicone rubber seals that allow pipe movement and provide a seal between the pipe and the reactor buildings and maintain the negative internal pressure. The staff wanted the applicant to confirm that these penetration seals are included within the scope of licence renewal and are included in LRA Table 2.4.2.1.

In its response, by letter dated January 24, 2005, the applicant stated:

With the exception of the Control Room, the Reactor Building is designed to maintain an internal negative pressure under neutral wind conditions in order to serve as the secondary containment whose primary purpose is to minimize the ground level release of airborne radioactive materials and to provide for a controlled, elevated release of the building atmosphere under accident conditions. The Control Room and portions of the Control Bay that are contained within the Reactor Building are maintained at a positive pressure to prevent the introduction of fission products during design basis events. Piping that is not anchored within a reinforced concrete wall is sealed with caulking or sealants. The reinforced concrete wall, and caulking and sealants are identified as component type "Reinforced Concrete Beams, Columns, Walls, and Slabs" and "Caulking & Sealants" respectively in Table 2.4.2.1 as requiring aging management review with a pressure boundary (PB) intended function.

The staff found the above response adequate and acceptable. Therefore, the staff's concern described in RAI 2.4-5 is resolved.

In RAI 2.4-12, dated December 20, 2004, the staff stated that based on information provided in LRA Sections 2.4.2.1, 2.4.2.2, 2.4.3.1, 2.4.4.1, and 2.4.7.1, it was unclear which cranes and hoists were determined to be within the scope of license renewal and which subset of the in-scope items have been screened in as items requiring an AMR. Therefore, the staff requested the applicant to clarify the treatment of cranes and hoists in the scoping and screening, and in the AMR. The applicant was requested to submit the following information:

- A list of all cranes, hoists, rails, and associated components in the scope of license renewal.
- Additional information to identify the location within the LRA where cranes, hoists, rails, and associated components are addressed. If these specific components are not considered to be within the scope of license renewal, provide the technical bases for their exclusion.
- A list of all cranes, hoists, rails, and associated components requiring an AMR (i.e., passive, long-lived components).
- A list of all cranes, hoists, rails, and associated components requiring aging management and/or TLAA.

In its response, by letter dated January 24, 2005, the applicant stated that the cranes and hoists are addressed in LRA Section 2.3.3.34 and the AMR results are contained in Table 3.3.2.34. This same question was asked in RAI 2.3.3.34-1, dated August 31, 2004. In its response to RAI 2.3.3.34-1 dated October 19, 2004, the applicant stated:

The following buildings that contain NSR cranes and monorails which could potentially prevent safety related SSCs from performing their intended function(s) are: Reactor Building, Primary Containment, Diesel Generator Buildings, Intake Pumping Station, and Reinforced Concrete Chimney. All cranes and monorails in these buildings are in scope. The Mobile A-frames is a crane on wheels. The A-frame cranes are in scope since they could be used in a safety related building. This crane is subject to an AMR.

The staff found that the applicant had adequately responded to RAI 2.4-12 related to scoping and screening of cranes, hoists, rails, and associated components. Therefore, the staff's concern described in RAI 2.4-12 is resolved.

#### 2.4.2.1.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the reactor buildings components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the reactor buildings components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.4.2.2 Equipment Access Lock**

#### 2.4.2.2.1 Summary of Technical Information in the Application

In LRA Section 2.4.2.2, the applicant described the equipment access lock. The equipment access lock is a shared feature for all three reactor buildings. The equipment access lock is a reinforced concrete structure, supported on piles, located on the south end of the Unit 1 reactor building. The structure is sized to allow for the passage of a railcar or a tractor trailer within the structure. This allows for the transit of large equipment into, or out of, the reactor buildings, while maintaining the secondary containment. The equipment access lock is an airlock with large equipment doors that open to the outside environment on the south end, and allow access to the Unit 1 reactor building on the north end.

The equipment access lock contains SR components that are relied upon to remain functional during and following DBEs. The failure of NSR SSCs in the equipment access lock could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides controls for the potential release of fission products to the external environment
- provides a secondary containment envelope between the reactor building and the outside entrance
- provides structural support and shelter/protection for SR and NSR components
- provides flood protection barrier for internal and external flooding events

- provides a barrier for protection against internally or externally generated missiles
- provides a pressure boundary
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support for structures and components within the scope of license renewal
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.2.2, the applicant identified the following equipment access lock component types that are within the scope of license renewal and subject to an AMR:

- caulking and sealants
- compressible joints and seals
- controlled leakage doors
- electrical and I&C penetrations
- mechanical penetrations
- piles
- reinforced concrete beams, columns, walls, and slabs
- structural steel beams, columns, plates, and trusses

#### 2.4.2.2.2 Staff Evaluation

The staff reviewed LRA Section 2.4.2.2 and UFSAR Sections 5.3.3.5 and 12.2.9 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.4.2.2.3 Conclusion

The staff reviewed the LRA and related structural components to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the equipment access lock components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the equipment access lock components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.4.3 Class 1 Group 3 Structures**

In LRA Section 2.4.3, the applicant identified the structures and components of the Class 1 Group 3 structures that are subject to an AMR for license renewal.

The applicant described the supporting structures and components of the Class 1 Group 3 structures in the following sections of the LRA:

- 2.4.3.1 Diesel Generator Buildings
- 2.4.3.2 Standby Gas Treatment Building
- 2.4.3.3 Off-gas Treatment Building
- 2.4.3.4 Vacuum Pipe Building
- 2.4.3.5 Residual Heat Removal Service Water Tunnels
- 2.4.3.6 Electrical Cable Tunnel from the Intake Pumping Station to the Powerhouse
- 2.4.3.7 Underground Concrete Encased Structures
- 2.4.3.8 Earth Berm
- 2.4.3.9 South Access Retaining Walls (added LRA Section)

The corresponding subsections of the SER (2.4.3.1 – 2.4.3.9) present the staff's review findings with respect to the Class 1 Group 3 structures for BFN.

#### **2.4.3.1 Diesel Generator Buildings**

##### **2.4.3.1.1 Summary of Technical Information in the Application**

In LRA Section 2.4.3.1, the applicant described the diesel generator buildings. The diesel generator buildings provide structural support and shelter/protection for the diesel generators (DGs) and other components within the scope of license renewal that are essential for the safe shutdown of the plant when there is a sustained loss of off-site power. The Unit 1 and 2 diesel generator building houses four DGs that provide power to the four shared Unit 1 and 2 shutdown boards that are located in the reactor buildings. The Unit 3 DG building houses four DGs that provide power to the four separate unit shutdown boards that are located in the Unit 3 DG building.

The diesel generator buildings contain SR components that are relied upon to remain functional during and following DBEs. The failure of NSR SSCs in the diesel generator buildings could prevent the satisfactory accomplishment of an SR function. In addition, the DG buildings perform functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for SR and NSR components, and components that are relied upon to demonstrate compliance with the fire protection and SBO regulated events

- provides a rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant
- provides flood protection barrier for internal and external flooding events
- provides a barrier for protection against internally or externally generated missiles
- provides a pressure boundary
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support for structures and components within the scope of license renewal
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.3.1, the applicant identified the following diesel generator building component types that are within the scope of license renewal and subject to an AMR:

- caulking and sealants
- compressible joints and seals
- controlled leakage doors
- fire barriers
- hatches/plugs
- masonry block
- metal siding
- electrical and I&C penetrations
- mechanical penetrations
- reinforced concrete beams, columns, walls, and slabs
- structural steel beams, columns, plates, and trusses

#### 2.4.3.1.2 Staff Evaluation

The staff reviewed LRA Section 2.4.3.1 and UFSAR Sections 8.5, 12.2.8 and 12.2.13 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.3.1 identified an area in which additional information was required to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-8, dated December 20, 2004, the staff stated that LRA Section 2.4.3.1 refers to Units 1 and 2 DG building and Unit 3 DG building. The license renewal drawing 0-10E201-01-LR shows a diesel generator building at the west side of the reactor building and another DG building at the east side, without indicating which DG building is designated for Units 1 and 2 shutdown function. The other building is intended for shutdown of the Unit 3 reactor. Therefore, the staff requested the applicant to clarify this ambiguity and explain why the four separate Unit 3 shutdown boards are located in Unit 3 DG building, whereas the other four shared Units 1 and 2 shutdown boards are located in the reactor buildings. Also regarding LRA Table 2.4.3.1, the applicant was asked to identify other items such as structural steel embedments, carbon steel boltings, reinforced concrete foundation footings, grouted concrete, and water proofing membrane materials that require an AMR.

In its response, by letter dated January 24, 2005, the applicant stated:

The original layout for Browns Ferry was a two unit site with a common Diesel Generator Building (DGB). Unit 3 was added after the initial design and provided with its own Diesel Generator Building and shutdown board rooms within the DGB. The following components are also located in the Units 1 and 2 Diesel Generator Building and Unit 3 Diesel Generator Building and are evaluated as Structures and Component Supports commodities in LRA Section 2.4.8:

- ASME Equivalent Supports and Components
- Cable Trays and Supports
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Equipment Supports and Foundations
- HVAC Duct Supports
- Instrument Line Supports
- Instrument Racks, Frames, Panels, & Enclosures
- Non-ASME Equivalent Supports and Components
- Stairs, Platforms, Grating Supports
- Tube Track

The applicant noted that in-scope components evaluated in LRA Section 2.4.8 also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including baseplate and grout) to the structure. Waterproofing membranes are not relied on to support the intended functions of the structural components of the BFN structures.

The staff found the above response provided sufficient information to clarify the ambiguity noted in RAI 2.4-8. Therefore, the staff's concern described in RAI 2.4-8 is resolved.

#### 2.4.3.1.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the

DG buildings components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the diesel generator buildings components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.3.2 Standby Gas Treatment Building**

##### **2.4.3.2.1 Summary of Technical Information in the Application**

In LRA Section 2.4.3.2, the applicant described the SGT building. The SGT building houses shared components for all three units and provides a protected environment for the SGT system. The building consists of two double-barreled, reinforced concrete, box-frame structures with closed ends. The two structures are located side-by-side and adjacent to the southwest corner of the Unit 1 reactor building. The two structures also lie within the earth berm. One structure houses two SGT trains, and the other structure houses the remaining SGT train.

The SGT building contains SR components that are relied upon to remain functional during and following DBEs. The failure of NSR SSCs in the SGT building could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for SR and NSR components
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support for structures and components within the scope of license renewal
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.3.2, the applicant identified the following SGT building component types that are within the scope of license renewal and subject to an AMR:

- electrical and I&C penetrations
- mechanical penetrations
- reinforced concrete beams, columns, walls, and slabs

##### **2.4.3.2.2 Staff Evaluation**

The staff reviewed LRA Section 2.4.3.2 and UFSAR Sections 5.3 and 12.2.10 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant

had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.4.3.2.3 Conclusion

The staff reviewed the LRA and related structural components to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the SGT building components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the SGT building components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.4.3.3 Off-Gas Treatment Building**

#### 2.4.3.3.1 Summary of Technical Information in the Application

In LRA Section 2.4.3.3, the applicant described the off-gas treatment building. The off-gas treatment building is an underground structure that houses the off-gas system charcoal adsorbers and the supporting equipment for BFN. The exterior walls and bottom slab are designed and constructed to maintain their structural integrity if a partial collapse of the reinforced concrete chimney were to occur during an external event (i.e., seismic, tornadic, etc.). The maintained structural integrity would not permit water leakage into, or out of, the building below an elevation of 566.25 feet.

The portions of the off-gas treatment building containing components subject to an AMR include the exterior walls and bottom slab.

The off-gas treatment building contains SR components that are relied upon to remain functional during and following DBEs.

The intended functions within the scope of license renewal include the following:

- prevents the release of radiation into the surrounding groundwater from the failure or collapse of the activated charcoal beds
- provides a pressure boundary

In LRA Table 2.4.3.3, the applicant identified the following off-gas treatment building component types that are within the scope of license renewal and subject to an AMR:

- caulking and sealants
- mechanical penetrations
- reinforced concrete beams, columns, walls, and slabs

#### 2.4.3.3.2 Staff Evaluation

The staff reviewed LRA Section 2.4.3.3 and UFSAR Section 12.2.14 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.3.3 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-9(a), dated December 20, 2004, the staff stated that LRA Section 2.4.3 lists several structures, that are not shown in drawing 0-10E201-01-LR. In LRA Section 2.4.3.3, the off-gas treatment building is described to have only exterior walls and bottom slab, implying that there is no top slab for the building. Therefore, the staff requested the applicant to confirm that the building has no top slab and no component types (e.g., electrical and I&C penetrations, structural steel embedments, carbon steel boltings, reinforced concrete foundation footings, grouted concrete, and water proofing membrane materials, etc.), other than those listed in LRA Table 2.4.3.3, that require an AMR.

In its response, by letter dated January 24, 2005, the applicant stated:

Section 2.4.3.3 of the LRA identifies the Off-Gas Treatment Building as an underground structure. The Off-Gas Treatment Building is an underground structure with exterior walls, interior walls and slabs, bottom or foundation slab and a top slab. The exterior walls and bottom slab are designed and constructed to maintain their structural integrity during a partial collapse of the Reinforced Concrete Chimney during a design basis event (tornado) so that they will not permit water leakage into or out of the building below elevation 566.25 feet (Reference UFSAR 12.2.14). The top slab is not required for the intended function of preventing release of radiation from the failure/collapse of the activated charcoal beds into the surrounding groundwater. Other than the "Caulking and Sealants," "Penetrations, Mechanical," and the "Reinforced Concrete Beams, Columns, Walls and Slabs" components noted on LRA Table 2.4.3.3, there are no other components that require an aging management review.

The staff found that the applicant had adequately responded to the part of RAI 2.4-9(a) related to the off-gas treatment building structure. Therefore the staff's concern described in RAI 2.4-9(a) is resolved.

#### 2.4.3.3.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the off-gas treatment building components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the off-gas treatment building components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.3.4 Vacuum Pipe Building**

##### 2.4.3.4.1 Summary of Technical Information in the Application

In LRA Section 2.4.3.4, the applicant described the vacuum pipe building. The vacuum pipe building is a structure shared by all of the units. It is located underground and provides structural support and shelter/protection for the condenser circulating water system vacuum breaker components. These components prevent backflow from the warm water channel into the intake channel. This ensures that the maximum temperature analysis assumptions, for accident cooling systems, are maintained during accidents and events.

The vacuum pipe building contains SR components that are relied upon to remain functional during and following DBEs. The failure of NSR SSCs in the vacuum pipe building could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for SR and NSR components
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support for structures and components within the scope of license renewal
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.3.4, the applicant identified the following vacuum pipe building component types that are within the scope of license renewal and subject to an AMR:

- hatches and plugs
- electrical and I&C penetrations
- mechanical penetrations
- reinforced concrete beams, columns, walls, and slabs

#### 2.4.3.4.2 Staff Evaluation

The staff reviewed LRA Section 2.4.3.4 and UFSAR Section 12.2.7.8.3 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.3.4 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-9(b), dated December 20, 2004, the staff stated that LRA Section 2.4.3 lists several structures that are not shown in drawing 0-10E201-01-LR. Therefore, the staff requested the applicant to describe the specific location of the vacuum pipe building and confirm that there are no items such as structural steel embedments, carbon steel boltings, reinforced concrete foundation footings, grouted concrete, compressible joints and seals, waterproofing membrane and caulking materials that require an AMR.

In its response, by letter dated January 24, 2005, the applicant stated:

The vacuum pipe building is an underground structure accessed through a manhole and contains the condenser circulating water system vacuum breaker components that prevent back flow from the warm water channel to the intake channel (Reference UFSAR 12.2.7.8.3). The vacuum pipe building is an underground structure located south-east of the plant administration building as depicted on TVA drawing 0-10E201-01 and LR drawing 0-10E201-01-LR. The following components are also located in the vacuum pipe building and are evaluated as structures and component supports commodities in LRA Section 2.4.8:

- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Non-ASME Equivalent Supports and Components

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4-9(b) concerning the vacuum pipe building structure. Therefore, the staff's concern described in RAI 2.4-9(b) is resolved.

#### 2.4.3.4.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the vacuum pipe building components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the vacuum pipe building components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.3.5 Residual Heat Removal Service Water Tunnels**

##### 2.4.3.5.1 Summary of Technical Information in the Application

In LRA Section 2.4.3.5, the applicant described the RHRSW tunnels. The RHRSW tunnels are underground, multi-plate, arch tunnels that protect SR piping systems. This includes the RHRSW and EECW supply and discharge piping that penetrates the south wall of the reactor building and is buried, below grade, near the south end of the tunnel.

The failure of an NSR SSC in the RHRSW tunnel could prevent the satisfactory accomplishment of an SR function. The RHRSW tunnel also performs functions that support fire protection.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for SR and NSR components, and components that are relied upon to demonstrate compliance with the fire protection regulated event
- prevents debris from entering a system or component
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.3.5, the applicant identified the following RHRSW tunnel component types that are within the scope of license renewal and subject to an AMR:

- compressible joints and seals
- electrical and I&C penetrations
- piles
- tunnels

#### 2.4.3.5.2 Staff Evaluation

The staff reviewed LRA Section 2.4.3.5 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.3.5 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-9(c), dated December 20, 2004, the staff stated that LRA Section 2.4.3, Class 1 Group 3 Structures, lists several BFN structures that are not shown in drawing 0-10E201-01-LR. Therefore, the staff requested the applicant to describe the specific location of the RHRSW tunnels including their embedded boundaries in drawing 0-10E201-01-LR. The staff also requested the applicant to identify, as appropriate, items requiring an AMR that are part of the service water tunnels, such as structural steel embedments, carbon steel boltings, reinforced concrete beams, walls, slabs and foundation footings, grouted concrete, mechanical penetrations, waterproofing membrane and caulking materials.

In its response, by letter dated January 24, 2005, the applicant stated:

The RHRSW tunnels are underground multi-plate arch tunnels that are buried in the earth berm. The north end of the tunnel terminates at the south wall of the reactor building. The south end of the tunnel is open to the outside on the south end of the earth berm. There are two tunnels for each reactor building. The following components are also located in the RHRSW tunnels and are evaluated as structures and component supports commodities in LRA Section 2.4.8:

- ASME Equivalent Supports and Components
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Non-ASME Equivalent Supports and Components

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4-9(c) related to the RHRSW structure. Therefore, the staff's concern described in RAI 2.4-9(c) is resolved.

#### 2.4.3.5.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the RHRSW tunnels components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the RHRSW tunnels components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.3.6 Electrical Cable Tunnel from the Intake Pumping Station to the Powerhouse**

##### 2.4.3.6.1 Summary of Technical Information in the Application

In LRA Section 2.4.3.6, the applicant described the electrical cable tunnel from the intake pumping station to the powerhouse, which is a Class I structure. The structure is an underground, concrete-encased tunnel that provides structural support and shelter/protection for power cables. These power cables are intended for components in the intake pumping station and include the RHRSW system, EECW system, and electric fire pumps. The tunnel runs east-west under the southern portion of the turbine buildings.

The electrical cable tunnel from the intake pumping station to the powerhouse structure contains SR components that are relied upon to remain functional during and following DBEs. The failure of NSR SSCs in the electrical cable tunnel from the intake pumping station to the powerhouse structure could prevent the satisfactory accomplishment of an SR function. In addition, the electrical cable tunnel from the intake pumping station to the powerhouse structure performs functions that support fire protection.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for SR and NSR components, and components that are relied upon to demonstrate compliance with the fire protection regulated event
- provides a rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support for structures and components within the scope of license renewal

In LRA Table 2.4.3.6, the applicant identified the following electrical cable tunnel component types that are within the scope of license renewal and subject to an AMR:

- fire barrier
- electrical and I&C penetrations
- tunnels

The electrical cable tunnel from the intake pumping station to the powerhouse is an underground concrete-encased tunnel that provides structural support and shelter/protection for the power cables for components (including the RHRSW System, EECW System, and the electric fire pumps) in the intake pumping station. The tunnel also runs east-west under the southern portion of the turbine buildings.

#### 2.4.3.6.2 Staff Evaluation

The staff reviewed LRA Section 2.4.3.6 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.3.6 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-9(d), dated December 20, 2004, the staff stated that LRA Section 2.4.3, Class 1 Group 3 Structures, lists several structures that are not shown in drawing 0-10E201-01-LR. Therefore, the staff requested the applicant to describe the specific locations of the electrical cable tunnel from the intake pumping station to the powerhouse, including the portion running east-west under the southern portion of the turbine buildings. The staff also requested the applicant to identify items such as structural steel embedments, carbon steel boltings, reinforced concrete beams, walls, slabs, and foundation footings, grouted concrete, mechanical penetrations, and waterproofing membrane and caulking materials that require an AMR.

In its response, by letter dated January 24, 2005, the applicant stated:

The Electrical Cable Tunnel is an underground concrete encased tunnel that runs from the northwest corner of the Intake Pumping Station (IPS) to the southeast corner of the unit 3 Turbine Building and then east-west along the southern portion of the BFN Turbine Building. The following components are also located in the Electrical Cable Tunnel and are evaluated as Structures and Component Supports commodities in LRA Section 2.4.8:

- Cable Trays and Supports
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4-9(d) related to the electrical cable tunnel structure. Therefore, the staff's concern described in RAI 2.4-9(d) is resolved.

#### 2.4.3.6.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the electrical cable tunnel components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the electrical cable tunnel components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.3.7 Underground Concrete Encased Structures**

##### 2.4.3.7.1 Summary of Technical Information in the Application

In LRA Section 2.4.3.7, the applicant described the underground concrete encased structures. The underground concrete encased structures include SR manholes, handholes and duct banks that span between the SR structures, manholes, and handholes. This group of structures also includes those manholes, handholes, and duct banks that are required to support the SBO regulated event.

The underground concrete encased structures contain SR components that are relied upon to remain functional during and following DBEs. The failure of NSR SSCs in the underground concrete encased structures could prevent the satisfactory accomplishment of an SR function. In addition, the underground concrete encased structures performs functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for SR and NSR components, and components that are relied upon to demonstrate compliance with the fire protection and SBO regulated events
- provides flood protection barrier for internal and external flooding events
- shelters and protects a component from the effects of weather or localized environmental conditions

- provides structural and functional support for structures and components within the scope of license renewal
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.3.7, the applicant identified the following underground concrete encased structures component types that are within the scope of license renewal and subject to an AMR:

- caulking and sealants
- duct banks, manholes
- electrical and I&C penetrations
- penetrations, mechanical

#### 2.4.3.7.2 Staff Evaluation

The staff reviewed LRA Section 2.4.3.7 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.3.7 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below

In RAI 2.4-9(e), dated December 20, 2004, the staff stated that LRA Section 2.4.3, Class 1 Group 3 structures lists several BFN structures on page 2.4-12 that are not shown in drawing 0-10E201-01-LR. Therefore, the staff requested the applicant to list the in-scope structures that have one or more of the underground concrete encased structures described in LRA Section 2.4.3.7. The staff also requested the applicant to identify items such as structural steel embedments, carbon steel boltings, reinforced concrete walls, slabs and foundation footings, grouted concrete, and waterproofing membrane that require an AMR.

In its response, by letter dated January 24, 2005, the applicant stated :

The in-scope structures described in LRA Section 2.4.3.7 include the following:

- Safety-related handhole (HH) No. 16, located in the yard area north-west of the Intake Pumping Structure (IPS) and safety-related handhole (HH) No. 26, located in the yard area north-east of the Unit 3 Diesel Generator Building (DGB) and south of Condensate Storage Tanks Nos. 1, 2, and 3.

- Safety-related concrete duct bank (inaccessible) that spans from the Unit 1 & 2 Diesel Generator Building to the Standby Gas Treatment Building, safety-related concrete duct bank (inaccessible) that spans from the IPS to HH No. 16 to HH No. 26 and to the Electrical Cable Tunnel from the IPS to the Powerhouse, SR concrete duct bank (inaccessible) that spans from the unit 3 Diesel Generator Building to the Electrical Cable Tunnel from the IPS to the Powerhouse, and the safety-related concrete duct bank (inaccessible) that spans from the Containment Atmosphere Dilution Storage Tank's A and B foundations to the Reactor Building.
- Manholes A and B which provide access to the concrete tunnel located in the 161 kV and 500 kV Switchyards that support the 10 CFR 54.4(a)(3) SBO regulated event. NOTE: The concrete tunnel located in the 161 kV and 500 kV switchyards is within the scope of license renewal and identified in LRA sections 2.4.7.5 and 2.4.7.6, respectively, as component type tunnels.
- Handholes 1 - 13 and associated duct banks (inaccessible) located in the transformer yard on the north side of the Turbine Building that support the 10 CFR 54.4(a)(3) SBO regulated event.
- The following components are also located in the Underground Concrete Encased Structures and are evaluated as Structures and Component Supports commodities in LRA Section 2.4.8:
  - Cable Trays and Supports
  - Conduit and Supports
  - Electrical Panels, Racks, Cabinets, and Other Enclosures
  - Non-ASME Equivalent Supports and Components

The applicant also noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4-9(e) related to underground concrete encased structures. Therefore, the staff's concern described in RAI 2.4-9(e) is resolved.

#### 2.4.3.7.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the underground concrete encased structures components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the underground concrete encased structures components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.3.8 Earth Berm**

##### **2.4.3.8.1 Summary of Technical Information in the Application**

In LRA Section 2.4.3.8, the applicant described the earth berm. The earth berm is classified as an SR earthen embankment and is common to BFN. The earth berm extends along the west, south, and east walls of the reactor building from the Unit 1 DG building to the Unit 3 DG building. The equipment access lock, the RHRSW tunnels, the vent vaults, and the SGT building are all located within the earth berm.

The earth berm contains SR components that are relied upon to remain functional during and following DBEs.

The intended function, within the scope of license renewal, is to provide structural and functional support for in-scope structures and features.

In LRA Table 2.4.3.8, the applicant identified the following earth berm component type that is within the scope of license renewal and subject to an AMR:

- intake canals, dikes, embankments

##### **2.4.3.8.2 Staff Evaluation**

The staff reviewed LRA Section 2.4.3.8 and UFSAR Sections 12.2.9 and 12.2.10 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

##### **2.4.3.8.3 Conclusion**

The staff reviewed the LRA and related structural components to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the earth berm components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the earth berm components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

**Section 2.4.3.9.** In earlier RAI 2.4-1 response, dated January 24, 2005, the applicant stated that the south access retaining walls were inadvertently omitted. The retaining walls are SR

structural features that maintain the stability of the earth berm, therefore are included in the scope of license renewal. In Attachment 2 to its letter, the applicant added LRA Section 2.4.3.9, as discussed below.

#### **2.4.3.9 South Access Retaining Walls**

In added LRA Section 2.4.3.9, the applicant described the south access retaining walls. The south access retaining walls are required to support the existing earth berm for the construction of a new temporary access building. This access building will allow Unit 1 recovery personnel entry into the Unit 1 reactor building during the recovery of Unit 1. These retaining walls have been classified as SR to match the safety function of the earth berm. These retaining walls are located east of the equipment access lock.

The south access retaining walls contain SR components that are relied upon to remain functional during and following DBEs.

The intended function, within the scope of license renewal, is to provide structural and functional support, for in-scope structures and components, by an SR component.

In added LRA Table 2.4.3.9, the applicant identified the reinforced concrete beams, columns, walls, and slabs component type that is within the scope of license renewal and subject to an AMR.

##### **2.4.3.9.2 Staff Evaluation**

The staff reviewed added LRA Section 2.4.3.9 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the added section of the LRA in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

##### **2.4.3.9.3 Conclusion**

The staff reviewed the added LRA Section 2.4.3.9 and related structural/component information to determine whether any SSCs that should be within the scope of license renewal were not identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR were not identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the south access retaining walls components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant had adequately identified the south access retaining walls components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

## **2.4.4 Class 1 Group 6 Structures**

In LRA Section 2.4.4, the applicant identified the structures and components of the Class 1 Group 6 structures that are subject to an AMR for license renewal.

The applicant described the supporting structures and components of the Class 1 Group 6 structures in the following sections of the LRA:

- 2.4.4.1 intake pumping station
- 2.4.4.2 gate structure No. 3
- 2.4.4.3 intake channel
- 2.4.4.4 north bank of cool water channel east of gate structure No. 2
- 2.4.4.5 south dike of cool water channel between gate structure Nos. 2 and 3

The corresponding subsections of the SER, 2.4.4.1 – 2.4.4.5, present the staff's review findings with respect to the Class 1 Group 6 structures.

### **2.4.4.1 Intake Pumping Station**

#### **2.4.4.1.1 Summary of Technical Information in the Application**

In LRA Section 2.4.4.1, the applicant described the intake pumping station, which is a Class 1 structure constructed of reinforced concrete. The intake pumping station houses components for BFN and provides structural support and shelter/protection for the condenser circulating water pumps, the electric fire pumps, and the pumps that supply the RHRSW and the EECW systems. The station also protects SR equipment and components, such as the pumps supplying the RHRSW and EECW systems, from design-basis events such as earthquakes, floods, and tornadoes.

The intake pumping station contains SR components that are relied upon to remain functional during and following DBEs. The failure of NSR SSCs in the intake pumping station could prevent the satisfactory accomplishment of an SR function. In addition, the intake pumping station performs functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for SR and NSR components, and components relied upon to demonstrate compliance with the fire protection and SBO regulated events
- provides a rated fire barrier to confine or retard a fire from spreading to or from adjacent areas of the plant
- provides a flood protection barrier for internal and external flooding events
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support for structures and components within the scope of license renewal

- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.4.1, the applicant identified the following intake pumping station component types that are within the scope of license renewal and subject to an AMR:

- caulking and sealants
- compressible joints and seals
- controlled leakage doors
- fire barriers
- masonry block
- electrical and I&C penetrations
- mechanical penetrations
- reinforced concrete beams, columns, walls, and slabs
- structural steel beams, columns, plates, and trusses

#### 2.4.4.1.2 Staff Evaluation

The staff reviewed LRA Section 2.4.4.1 and UFSAR Sections 12.2.7 and 12.2.16 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.4.1 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-10(a), dated December 20, 2004, the staff requested the applicant to provide additional information regarding the intake pumping station structure. Specifically, the RAI requested the applicant to identify, as applicable, items such as hatches and plugs, structural steel embedments, carbon steel boltings, reinforced concrete foundation footings, grouted concrete, and waterproofing membrane materials that require an AMR.

In its response, by letter dated January 24, 2005, the applicant stated:

The following components are also located in the intake pumping station and are evaluated as structures and component supports commodities in LRA Section 2.4.8:

- ASME Equivalent Supports and Components
- Cable Trays and Supports
- Conduit and Supports

- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Equipment Supports and Foundations
- Instrument Line Supports
- Non-ASME Equivalent Supports and Components
- Stairs, Platforms, Grating Supports
- Tube Track

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4-10(a) related to the intake pumping station structure. Therefore, the staff's concern described in RAI 2.4-10(a) is resolved.

#### 2.4.4.1.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the intake pumping station components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the intake pumping station components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.4.4.2 Gate Structure No. 3**

#### 2.4.4.2.1 Summary of Technical Information in the Application

In LRA Section 2.4.4.2, the applicant described the gate structure No. 3, which is a Class 1 structure common to all three of the units. The structure acts as a skimmer wall for water drawn from Wheeler Reservoir and used in the plant for cooling. Gate structure No 3 is designed so that a sufficient flow of water from Wheeler Reservoir is provided to the intake channel, in order to supply the RHRSW and the EECW systems. Gate structure No. 3 is located at the southeast end of the plant, below the intake pumping station and the intake channel.

Gate structure No. 3 contains SR components that are relied upon to remain functional during and following DBEs. In addition, gate structure No. 3 performs functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- ensures a source of cooling water to SR components

- ensures a source of cooling water to components relied upon to demonstrate compliance with the fire protection and SBO events
- provides for flow distribution
- provides structural and functional support for structures and components within the scope of license renewal

In LRA Table 2.4.4.2, the applicant identified the following gate structure No. 3 component types that are within the scope of license renewal and subject to an AMR:

- piles
- reinforced concrete beams, columns, walls, and slabs
- structural steel beams, columns, plates, and trusses

#### 2.4.4.2.2 Staff Evaluation

The staff reviewed LRA Section 2.4.4.2 and UFSAR Sections 11.6 and 12.2.7 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.4.4.2.3 Conclusion

The staff reviewed the LRA and related structural components to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the gate structure No. 3 components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the gate structure No. 3 components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.4.4.3 Intake Channel**

#### 2.4.4.3.1 Summary of Technical Information in the Application

In LRA Section 2.4.4.3, the applicant described the intake channel, which is common to all three units and provides an excavated channel that extends from the intake pumping station to the river channel that would exist if the Wheeler Dam failed. The channel provides a source of water to the condenser circulating water system and the other plant cooling systems during

normal operation. The channel also provides a source of cooling water, post-transient and post-accident, for decay heat removal, containment cooling, spent fuel cooling, control bay cooling, essential equipment cooling, and fire protection. In addition, the channel can provide sufficient flow and heat sink capacity to maintain a safe shutdown following a failure of the downstream Wheeler Dam.

The intake channel contains SR components that are relied upon to remain functional during and following DBEs. In addition, the intake channel performs functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- ensures a source of cooling water to SR components
- ensures a source of cooling water to components relied upon to demonstrate compliance with the fire protection and SBO events
- provides a source of cooling water
- provides structural and functional support for structures and components within the scope of license renewal

In LRA Table 2.4.4.3, the applicant identified the following intake channel component type that is within the scope of license renewal and subject to an AMR:

- intake canals, dikes, embankments

#### 2.4.4.3.2 Staff Evaluation

The staff reviewed LRA Section 2.4.4.3 and UFSAR Sections 2.4.2 and 12.2.7 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.4.4.3.3 Conclusion

The staff reviewed the LRA and related structural components to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the intake channel

components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the intake channel components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.4.4 North Bank of the Cool Water Channel East of Gate Structure No. 2**

##### **2.4.4.4.1 Summary of Technical Information in the Application**

In LRA Section 2.4.4.4, the applicant described the north bank of the cool water channel east of gate structure No. 2. The structure is an earthen embankment that is located on the north side of the cool water channel and south of the reactor buildings. The structure is SR, with a sloped portion protected by vegetation and rock rip-rap. The bank is designed to protect the buried RHRSW system discharge piping that is located within the bank that discharges into the Wheeler Reservoir.

The north bank of the cool water channel east of gate structure No. 2 contains SR components that are relied upon to remain functional during and following DBEs. In addition, the structure performs functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides for structural support of the buried SR components, namely piping, and components relied upon to demonstrate compliance with the fire protection and SBO regulated events
- provides structural and functional support for structures and components within the scope of license renewal

In LRA Table 2.4.4.4, the applicant identified the following component type in the north bank of the cool water channel east of gate structure No. 2 that is within the scope of license renewal and subject to an AMR:

- intake canals, dikes, embankments

##### **2.4.4.4.2 Staff Evaluation**

The staff reviewed LRA Section 2.4.4.4 and UFSAR Section 12.2.7 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.4.4.4.3 Conclusion

The staff reviewed the LRA and related structural components to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the components of the north bank of the cool water channel east of gate structure No. 2 that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the components of the north bank of the cool water channel east of gate structure No. 2 that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.4.5 South Dike of Cool Water Channel between Gate Structure Nos. 2 and 3**

##### 2.4.4.5.1 Summary of Technical Information in the Application

In LRA Section 2.4.4.5, the applicant described the south dike of the cool water channel between gate structure Nos. 2 and 3. The structure is an earthen dike that is located on the south side of the cool water channel and forms a boundary with the Wheeler Reservoir on the north side. The dike is an SR earthen structure that has a sloped portion that is protected with vegetation and rock rip-rap. The dike is designed to protect the buried RHRSW system discharge piping that is located within the dike and that discharges into Wheeler Reservoir.

The portions of the south dike of cool water channel between gate structure Nos. 2 and 3 structure containing components subject to an AMR are those portions located above the RHRSW system discharge piping.

The south dike of the cool water channel between gate structure Nos. 2 and 3 contains SR components that are relied upon to remain functional during and following DBEs. In addition, the dike performs functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides structural support of buried SR components, namely piping, and components relied upon to demonstrate compliance with the fire protection and SBO regulated events
- provides structural and functional support for structures and components within the scope of license renewal

In LRA Table 2.4.4.5, the applicant identified the following component types in the south dike of cool water channel between gate structure Nos. 2 and 3 that are within the scope of license renewal and subject to an AMR:

- intake canals, dikes, embankments

#### 2.4.4.5.2 Staff Evaluation

The staff reviewed LRA Section 2.4.4.5 and UFSAR Section 12.2.7 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.4.5 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-6, dated December 20, 2004, the staff stated that the LRA Section 2.4.4.5 states that the portion of the structure that contains components requiring an AMR is the portion above the RHRSW system discharge piping. Therefore, the staff requested applicant to clarify if the entire south dike of cooling water channel between gate structure Nos. 2 and 3, or only the portion indicated, is designated to be within the scope requiring an AMR. The staff also stated that, if the applicant scoped only a portion of the south dike structure as requiring an AMR, the staff wanted the applicant to discuss the basis for narrowing the scope. The staff required the applicant to clearly define the boundary within the AMR scope.

In its response, by letter dated January 24, 2005, the applicant stated:

Only the portion of the south dike of the cool water channel between gate structure Nos. 2 and 3 above the RHRSW discharge piping system plus approximately 30 feet on either side of the piping is within the scope of License Renewal and requires an AMR. The earthen dike provides a structural support intended function as noted in LRA Table 2.4.4.5 for the RHRSW discharge piping system and that portion of the dike has been qualified for a seismic event.

The staff found the above clarification provided by the applicant adequate and acceptable. The staff's concern described in RAI 2.4-6 is resolved.

#### 2.4.4.5.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the components in the south dike of the cool water channel between gate structure Nos. 2 and 3 that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the

components in the south dike of the cool water channel between gate structure Nos. 2 and 3 that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.5 Class 1 Group 8 Structures**

In LRA Section 2.4.5, the applicant identified the structures and components of the Class 1 Group 8 structures that are subject to an AMR for license renewal.

The applicant described the supporting structures and components of the Class 1 Group 8 structures in the following sections of the LRA:

- 2.4.5.1 condensate water storage tanks' foundations and trenches
- 2.4.5.2 containment atmosphere dilution storage tanks' foundations

The corresponding subsections of the SER 2.4.5.1 – 2.4.5.2, present the staff's review findings with respect to the Class 1 Group 8 structures for BFN.

##### ***2.4.5.1 Condensate Water Storage Tanks' Foundations and Trenches***

###### **2.4.5.1.1 Summary of Technical Information in the Application**

In LRA Section 2.4.5.1, the applicant described the condensate water storage tanks' foundations and trenches. The condensate water storage tanks' foundations and trenches are a shared feature for BFN. Five 500,000-gallon capacity tanks are supported on reinforced concrete ring foundations or on reinforced concrete slabs, on grade, with a sand bed. Only condensate water storage tank Nos. 1, 2, and 3 are within the scope of license renewal. Therefore, the foundations, trenches, and components for these tanks are also within the scope of license renewal.

The condensate water storage tanks' foundations and trenches are concrete structures that provide structural support to ensure that the condensate water storage tanks can provide: (1) a source of water makeup to the condenser hotwells and the CRD hydraulic system, during normal operations; (2) high purity water for miscellaneous makeup uses throughout the plant (e.g., demineralizer backwash and spent fuel pool makeup); and (3) a source of clean water to the HPCI and RCIC systems, when required for test; for reactor vessel makeup during accidents and regulated events; and to the core spray systems, when required for test.

The foundations and trenches for the three condensate water storage tanks that provide the normal water supply to the units, contain components requiring an AMR.

The condensate water storage tanks' foundations and trenches contain SR components that are relied upon to remain functional during and following DBEs. In addition, the condensate water storage tanks' foundations and trenches perform functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides physical support and shelter/protection for components that are relied upon to demonstrate compliance with the fire protection and SBO regulated events
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support for structures and components within the scope of license renewal
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.5.1, the applicant identified the following condensate water storage tanks' foundations and trenches component types that are within the scope of license renewal and subject to an AMR:

- equipment supports and foundations
- electrical and I&C penetrations
- mechanical penetrations
- structural steel beams, columns, plates, and trusses
- trenches

#### 2.4.5.1.2 Staff Evaluation

The staff reviewed LRA Section 2.4.5.1 and UFSAR Section 11.9 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.5.1 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-10(b), dated December 20, 2004, the applicant was asked to provide additional information regarding the condensate water storage tank's foundation and trenches. The staff also requested the applicant to confirm that the equipment supports and foundations as well as the trenches listed in LRA Table 2.4.5.1 consist of reinforced concrete components and to identify items such as structural steel embedments, carbon steel boltings, grouted concrete, and waterproofing membrane materials that require an AMR.

In its response, by letter dated January 24, 2005, the applicant stated:

Regarding the Condensate Water Storage Tank's Foundation and Trenches, "Equipment Supports and Foundations" as well as "Trenches" components listed in Table 2.4.5.1 consist of reinforced concrete and this is confirmed in Table 3.5.2.17 of the LRA. Note that the Condensate Storage Tanks are supported on a reinforced concrete ring foundation and the earthen fill material (rock and sand) inside the ring is identified as Item 1 of Table 3.5.2.17. The following components are also located on the Condensate Water Storage Tanks Foundations and Trenches and are evaluated as Structures and Component Supports commodities in LRA Section 2.4.8:

- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Instrument Racks, Frames, Panels, & Enclosures
- Non-ASME Equivalent Supports and Components

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4-10(b) related to the condensate water storage tanks' foundations and trenches structures. Therefore, the staffs concern described in RAI 2.4-10(b) is resolved.

#### 2.4.5.1.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the condensate water storage tanks' foundations and trenches components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the condensate water storage tanks' foundations and trenches components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.5.2 Containment Atmosphere Dilution Storage Tanks' Foundations**

##### 2.4.5.2.1 Summary of Technical Information in the Application

In LRA Section 2.4.5.2, the applicant described the CAD storage tanks' foundations. The tanks' foundations are reinforced concrete slabs on grade, or foundations, that provide structural support for the tanks. These tanks are used by the CAD system to control the concentration of combustible gases in the primary containment after an accident, and to provide a backup pneumatic supply to selected components when the control air system is unavailable.

The CAD system storage tanks' foundations contain SR components that are relied upon to remain functional during and following DBEs. In addition, the CAD storage tanks' foundations perform functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides structural support for SR components and components relied upon to demonstrate compliance with the fire protection and SBO regulated events
- provides structural and functional support for structures and components within the scope of license renewal

In LRA Table 2.4.5.2, the applicant identified the following CAD storage tanks' foundations component types that are within the scope of license renewal and subject to an AMR:

- equipment supports and foundations.

#### 2.4.5.2.2 Staff Evaluation

The staff reviewed LRA Section 2.4.5.2 and UFSAR Section 5.2.6 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.5.2 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-7, dated December 20, 2004, the staff stated that in LRA Section 2.4.5.2, the applicant discussed the screening results of the CAD storage tank's foundations. Therefore, for items included in LRA Table 2.4.5.2, the staff requested the applicant to identify other items that require an AMR, such as structural steel embedments, carbon steel boltings, reinforced concrete slabs and foundation footings, and grouted concrete.

In its response, by letter dated January 24, 2005, the applicant stated:

The reinforced concrete foundation slab for the Containment Atmosphere Dilution (CAD) Storage Tank's Foundation is included as part of the "Equipment Supports and Foundation" component type in Table 2.4.5.2. CAD Storage Tank's Foundation is a reinforced concrete foundation slab on grade that provides structural support for the tank of the CAD system.

The following components are also located on the CAD storage tank foundation and are evaluated as part of the structures and component supports commodity group in LRA Section 2.4.8:

- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Conduits and Supports
- Non-ASME Equivalent Supports and Components
- Instrument Racks, Frames, Panels, & Enclosures

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure.

The staff found that the response adequately clarified LRA Section 2.4.5.2. Therefore, the staff's concern described in RAI 2.4-7 is resolved.

#### 2.4.5.2.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the CAD storage tanks' foundations components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the CAD storage tanks' foundations components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### 2.4.6 Class 1 Group 9 Structures

#### 2.4.6.1 Reinforced Concrete Chimney

##### 2.4.6.1.1 Summary of Technical Information in the Application

In LRA Section 2.4.6.1, the applicant described the reinforced concrete chimney structure, which is a Class 1 structure that serves all three units. The chimney is 600 feet in elevation and provides an elevated release point for radioactive gases. These radioactive gases are released from the gaseous radwaste processing systems during normal plant operations. They are also released from the SGT system during secondary containment isolation and during primary containment venting. The hardened wetwell vent systems also release gaseous radwaste, following design-basis accidents. The system is designed so that Class 1 structures (with the exception of the off-gas treatment building) will not be damaged during DBEs.

The reinforced concrete chimney contains SR components that are relied upon to remain functional during and following DBEs. The failure of NSR SSCs in the reinforced concrete chimney could prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for SR and NSR components
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support for structures and components within the scope of license renewal
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.6.1, the applicant identified the following reinforced concrete chimney component types that are within the scope of license renewal and subject to an AMR:

- hatches and plugs
- metal roofing
- electrical and I&C penetrations
- mechanical penetrations
- reinforced concrete beams, columns, walls, and slabs
- roofing membrane
- structural steel beams, columns, plates, and trusses

#### 2.4.6.1.2 Staff Evaluation

The staff reviewed LRA Section 2.4.6.1 and UFSAR Section 12.2.4 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.4.6.1.3 Conclusion

The staff reviewed the LRA and related structural components to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the reinforced concrete chimney components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the reinforced concrete chimney components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

## **2.4.7 Non-Class 1 Structures**

In LRA Section 2.4.7, the applicant identified the structures and components of the non-Class 1 structures that are subject to an AMR for license renewal.

The applicant described the supporting structures and components of the non-Class 1 structures in the following sections of the LRA:

- 2.4.7.1 Turbine Buildings
- 2.4.7.2 Diesel High Pressure Fire Pump House
- 2.4.7.3 Vent Vault
- 2.4.7.4 Transformer Yard
- 2.4.7.5 161 kV Switchyard
- 2.4.7.6 500 kV Switchyard
- 2.4.7.7 Isolation Valve Pits (added LRA Section)
- 2.4.7.8 Radwaste Building (added LRA Section)
- 2.4.7.9 Service Building (added LRA Section)

The corresponding subsections of the SER, 2.4.7.1 – 2.4.7.6, present the staff's review findings with respect to the non-Class 1 structures for BFN.

### **2.4.7.1 Turbine Buildings**

#### **2.4.7.1.1 Summary of Technical Information in the Application**

In LRA Section 2.4.7.1, the applicant described the turbine buildings. The turbine buildings are a common Class II structure that consist of a reinforced concrete structure with a steel superstructure. The buildings are compartmentalized; the primary consideration for the design of the walls within the buildings is for radiation shielding. The turbine buildings provide structural support and shelter/protection for components required for safe shutdown following the SBO and fire protection regulated events. The buildings also provide support and shelter/protection for the outboard main steam isolation valves leakage pathway to condenser.

The failure of NSR SSCs in the turbine buildings could prevent the satisfactory accomplishment of an SR function. The turbine buildings also perform functions that support fire protection and SBO.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for the outboard main steam isolation valves leakage pathway to condenser
- not adversely impact other Class I structures as a result of a DBE
- provides structural support and shelter/protection for components relied upon to demonstrate compliance with the SBO and fire protection regulated events
- shelters and protects a component from the effects of weather or localized environmental conditions

- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.7.1, the applicant identified the following turbine buildings component types that are within the scope of license renewal and subject to an AMR:

- hatches/plugs
- metal roofing
- masonry block (within scope for Unit 2 only)
- electrical and I&C penetrations
- mechanical penetrations
- piles
- reinforced concrete beams, columns, walls, and slabs
- roof membrane
- structural steel beams, columns, plates and trusses

#### 2.4.7.1.2 Staff Evaluation

The staff reviewed LRA Section 2.4.7.1 and UFSAR Section 12.2.3 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.7.1 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4 -11(a), the applicant was requested to provide additional information regarding the turbine buildings. The staff also requested the applicant to explain the basis for stating that masonry block utilized for Units 1 and 3 is not in scope for the period of extended operation. The staff further requested the applicant to identify items that require an AMR, such as structural steel embedments, carbon steel boltings, grouted concrete, metal sidings, and waterproofing membrane materials.

In a letter dated January 24, 2005, the applicant responded as follows:

The masonry wall in the unit 2 Turbine Building provides a structural NSR support intended function for cable tray supports for cables required to support the off-site AC recovery for SBO requirements. The SBO cables are routed through the unit 2 Turbine Building in a cable gallery with walls constructed of masonry block, to the north end of the unit 2 Turbine Building, and then to a concrete tunnel buried in the yard north of the Turbine Building. The concrete tunnel provides access to the 161 kV and 500kV

Switchyards. Only the unit 2 Turbine Building masonry walls are in scope due to the unique cable gallery to tunnel routing of the cables required to support the off-site AC recovery for SBO requirements for all units. This unique cable gallery does not exist in the unit 1 or 3 Turbine Buildings.

The following components are also located in the BFN Turbine Buildings and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- ASME Equivalent Supports and Components
- Cable Trays and Supports
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Equipment Supports and Foundations
- Instrument Racks, Frames, Panels, & Enclosures
- Non-ASME Equivalent Supports and Components
- Stairs, Platforms, Grating Supports

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4 -11(a) related to the turbine buildings structures. Therefore, the concern described in RAI 2.4-11(a) is resolved.

#### 2.4.7.1.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the turbine buildings components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the turbine buildings components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.7.2 Diesel High Pressure Fire Pump House**

##### 2.4.7.2.1 Summary of Technical Information in the Application

In LRA Section 2.4.7.2, the applicant described the diesel high pressure fire pump house. The diesel high pressure fire pump house is a shared structure for BFN. The pump house provides structural support and shelter/protection for the diesel high pressure fire pump.

The entire diesel high pressure fire pump house contains components that are subject to an AMR. The diesel high pressure fire pump house performs functions that support fire protection.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for components relied upon to demonstrate compliance with the fire protection regulated event
- prevents debris from entering a system or component
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.7.2, the applicant identified the following diesel high pressure fire pump house component types that are within the scope of license renewal and subject to an AMR:

- metal roofing
- metal siding
- electrical and I&C penetrations
- mechanical penetrations
- piles
- reinforced concrete beams, columns, walls, and slabs
- roof membrane
- structural steel beams, columns, plates, and trusses

#### 2.4.7.2.2 Staff Evaluation

The staff reviewed LRA Section 2.4.7.2 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.7.2 identified area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4 -11(b), dated December 20, 2004, the staff requested the applicant to identify items that require an AMR, such as structural steel embedments, carbon steel boltings, grouted concrete, and waterproofing membrane materials.

In its response, by letter dated January 24, 2005, the applicant stated:

The following components are also located in the diesel high pressure fire pump house and are evaluated as structures and component supports commodities in LRA section 2.4.8:

- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures
- Equipment Supports and Foundations
- Non-ASME Equivalent Supports and Components

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4 -11(b) related to the diesel high pressure fire pump house structure. Therefore, the staff's concern described in RAI 2.4-11(b) is resolved.

#### 2.4.7.2.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the diesel high pressure fire pump house components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the diesel high pressure fire pump house components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.7.3 Vent Vaults**

##### 2.4.7.3.1 Summary of Technical Information in the Application

In LRA Section 2.4.7.3, the applicant described the vent vaults. A vent vault is provided for each unit. Each vent vault is a concrete structure with an open top. The base foundation for each vent vault is founded on compacted backfill that is located within the earth berm and adjacent to the respective reactor building. The vent vaults contain components required for the reactor building ventilation system supply, including the secondary containment isolation dampers.

The portions of the vent vaults containing components subject to an AMR include the east and west walls and the floor slab. The failure of NSR systems, SSCs in the vent vaults could prevent the satisfactory accomplishment of an SR function.

The intended function within the scope of license renewal is to provide structural and functional support for in-scope structures and components by an NSR component.

In LRA Table 2.4.7.3, the applicant identified the following vent vaults component types that are within the scope of license renewal and subject to an AMR:

- reinforced concrete beams, columns, walls, and slabs

#### 2.4.7.3.2 Staff Evaluation

The staff reviewed LRA Section 2.4.7.3 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.7.3 identified area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-9(a), dated December 20, 2004, the staff stated that LRA Section 2.4.3 lists several structures that are not shown in drawing 0-10E201-01-LR. Therefore, the staff requested the applicant to clarify the reason why the three vent vaults shown in drawing 0-10E201-01-LR do not indicate the specific systems or components contained or sheltered within them. Additionally, the applicant was requested to identify items that require an AMR, such as structural steel embedments, carbon steel boltings, grouted concrete, and waterproofing membrane materials.

In its response, by letter dated January 24, 2005, the applicant stated:

The three vent vaults are open-top concrete structures located within the earth berm adjacent to their associated reactor building. The vent vaults contain components required for the reactor building ventilation system supply, including the secondary containment isolation dampers. Other than the "Reinforced Concrete Beams, Columns, Walls and Slabs" noted on LRA Table 2.4.7.3, they contain no components that require an aging management review.

The staff found that the applicant had adequately responded to RAI 2.4-9(a) on the vent vaults structure. Therefore, the staff's concern described in RAI 2.4-9(a) is resolved.

#### 2.4.7.3.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the vent vaults components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the vent vaults components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.7.4 Transformer Yard**

##### 2.4.7.4.1 Summary of Technical Information in the Application

In LRA Section 2.4.7.4, the applicant described the transformer yard. The transformer yard is a shared feature for all three units. The transformer yard supports components required for power restoration following the SBO regulated event.

The transformer yard performs functions that support SBO.

The intended functions within the scope of license renewal include the following:

- provides structural support for components relied upon to demonstrate compliance with the SBO regulated event
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.7.4, the applicant identified the following transformer yard component types that are within the scope of license renewal and subject to an AMR:

- piles
- structural steel beams
- structural columns
- structural plates
- structural trusses

##### 2.4.7.4.2 Staff Evaluation

The staff reviewed LRA Section 2.4.7.4 and UFSAR Sections 8.2, 8.4 and 8.10 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the

applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.7.4 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI, as discussed below.

In RAI 2.4 -11(d), dated December 20, 2004, the staff requested the applicant, with respect to the transformer yard, to identify, items such as structural steel embedments, carbon steel plates and boltings, reinforced concrete pads and footings, grouted concrete, and waterproofing membrane materials that require an AMR.

In its response by letter, dated January 24, 2005, the applicant stated:

The following components are also located in the BFN Transformer Yard, and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- Equipment Supports and Foundations

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4-11(d) related to the transformer yard structure. Therefore, the staff's concern described in RAI 2.4-11(d) is resolved.

#### 2.4.7.4.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the transformer yard components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the transformer yard components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.7.5 161 kV Switchyard**

##### 2.4.7.5.1 Summary of Technical Information in the Application

In LRA Section 2.4.7.5, the applicant described the 161 kV switchyard, which is a shared feature for all three units. The switchyard routes power from offsite transmission lines into BFN

for onsite use. The 161 kV switchyard supports components required for power restoration following the SBO regulated event.

The 161 kV switchyard performs functions that support SBO.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for components that are relied upon to demonstrate compliance with the SBO regulated event
- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.7.5, the applicant identified the following 161 kV switchyard component types that are within the scope of license renewal and subject to an AMR:

- structural steel beams
- structural columns
- structural plates
- structural trusses
- tunnels

#### 2.4.7.5.2 Staff Evaluation

The staff reviewed LRA Section 2.4.7.5 and UFSAR Sections 1.5, 1.6, 8.1, 8.3, 8.4, and 8.10 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.7.5 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4 -11(d)(2), dated December 20, 2004, the staff requested the applicant to identify items that require an AMR, such as structural steel embedments, carbon steel plates and boltings, reinforced concrete pads and footings, grouted concrete, and waterproofing membrane materials.

In its response, by letter January 24, 2005, the applicant stated:

The following components are also located in the BFN 161 kV Switchyard and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- Equipment Supports and Foundations
- Cable Trays and Supports
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4-11(d) related to the 161 kV switchyard structure. Therefore, the staff's concern described in RAI 2.4-11(d) is resolved.

#### 2.4.7.5.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the 161 kV switchyard components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the 161 kV switchyard components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.4.7.6 500 kV Switchyard**

#### 2.4.7.6.1 Summary of Technical Information in the Application

In LRA Section 2.4.7.6, the applicant described the 500 kV switchyard. The 500 kV switchyard is a shared feature for all three units. The switchyard routes power to offsite transmission lines and can be used to route power into BFN for onsite use. The 500 kV switchyard supports components required for power restoration following an SBO regulated event.

The 500 kV switchyard performs functions that support SBO.

The intended functions within the scope of license renewal include the following:

- provides structural support and shelter/protection for components that are relied upon to demonstrate compliance with the SBO regulated event
- shelters and protects a component from the effects of weather or localized environmental conditions

- provides structural and functional support, for in-scope structures and components, by an NSR component

In LRA Table 2.4.7.6, the applicant identified the following 500 kV switchyard component types that are within the scope of license renewal and subject to an AMR:

- structural steel beams
- structural columns
- structural plates
- structural trusses
- tunnels

#### 2.4.7.6.2 Staff Evaluation

The staff reviewed LRA Section 2.4.7.6 and UFSAR Sections 1.5, 1.6, 8.1, 8.3, 8.4, and 8.10 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.7.4.6 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-11(d)(3), dated December 20, 2004, the staff requested the applicant to identify items that require an AMR, such as structural steel embedments, carbon steel plates and boltings, reinforced concrete pads and footings, grouted concrete, and waterproofing membrane materials.

In its response, by letter, dated January 24, 2005, the applicant stated:

The following components are also located in the BFN 500 kV Switchyard and are evaluated as Structures and Component Supports commodities in LRA section 2.4.8:

- Equipment Supports and Foundations
- Cable Trays and Supports
- Conduit and Supports
- Electrical Panels, Racks, Cabinets, and Other Enclosures

The applicant noted that for in-scope components evaluated in LRA Section 2.4.8, the components also include support structural members, welds, bolting, anchorage and building concrete at anchorage (including base plate and grout) to the structure. Waterproofing

membranes are not relied upon to support the intended functions of the structural components of BFN structures.

The staff found that the applicant had adequately responded to RAI 2.4-11(d) related to the 500 kV switchyard structure. Therefore, the staff's concern described in RAI 2.4-11(d) is resolved.

#### 2.4.7.6.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the 500 kV switchyard components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the 500 kV switchyard components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

**Section 2.4.7.7.** In earlier RAI 2.4-1 response, dated January 24, 2005, the applicant stated that isolation valve pits are Class II NSR structures that provide structural support and shelter protection for the hardened wetwell vent piping and components. Since these isolation valve pits provide an intended function for an in scope mechanical system, therefore, are included within the scope of license renewal. In Attachment 1 to its letter, the applicant added LRA Section 2.4.7.7, as discussed below.

#### **2.4.7.7 Isolation Valve Pits**

##### 2.4.7.7.1 Summary of Technical Information in the Application

In added LRA Section 2.4.7.7, the applicant described the isolation valve pits, stating that there is an isolation valve pit for each unit.

The failure of NSR SSCs in the isolation valve pits could potentially prevent the satisfactory accomplishment of an SR function.

The intended functions within the scope of license renewal include the following:

- shelters and protects a component from the effects of weather or localized environmental conditions
- provides structural and functional support, for in-scope structures and components, by an NSR component

In added LRA Table 2.4.7.7, the applicant identified the following isolation valve pits component types that are within the scope of license renewal and subject to an AMR:

- caulking & sealants
- penetrations electrical and I&C
- penetrations mechanical

- reinforced concrete beams, columns, walls, and slabs
- structural steel beams, columns, plates, and trusses

#### 2.4.7.7.2 Staff Evaluation

The staff reviewed added LRA Section 2.4.7.7 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the added section of the LRA in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

#### 2.4.7.7.3 Conclusion

The staff reviewed the added LRA Section 2.4.7.7 and related structural/component information to determine whether any SSCs that should be within the scope of license renewal were not identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR were not identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the isolation valve pits components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant had adequately identified the isolation valve pits components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

**Sections 2.4.7.8 and 2.4.7.9.** The staff, in an earlier RAI 2.1-2A(3) dated September 3, 2004, requested additional information related to seismic Class I piping boundaries for identifying additional piping segments and supports/equivalent anchors that need to be placed in the scope of license renewal to satisfy the 10 CFR 54.4(a)(2) criterion. The staff had asked whether if this review brought into scope any new buildings not in the original application. By response dated February 28, 2005, the applicant identified two additional buildings brought into the LRA scope and the added LRA sections are as follows.

#### **2.4.7.8 Radwaste Building**

##### 2.4.7.8.1 Summary of Technical Information in the Application

In LRA Section 2.4.7.8, the applicant identified the structures and components of the radwaste building that are subject to an AMR for license renewal.

The radwaste building is a cellular box-type concrete structure extending approximately 20 feet below grade and 30 feet above grade and supported by steel H-piles driven to bedrock. This building houses services common to all three units. The radwaste building is comprised predominantly of thick walls and slabs, the dimensions of which are determined by shielding

requirements. In a few instances, walls and slabs are determined by structural requirements. The roof system is a steel-framed structure with either bracket supports on concrete walls or steel columns supported by the concrete floor at an elevation of 580.0 feet.

In LRA Table 2.4.7.8, the applicant identified the following radwaste building component types that are within the scope of license renewal and subject to an AMR:

- masonry block
- metal roofing
- piles
- reinforced concrete beams, columns, walls, and slabs
- roof membrane
- structural steel beams, columns, plates, and trusses

#### 2.4.7.8.2 Staff Evaluation

The staff reviewed LRA Section 2.4.7.8 and UFSAR Section 12.2.5 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.7.8 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-15, dated March 25, 2005, the staff stated that LRA Section 2.4.7.8 states that "The portions of the radwaste building that contain components requiring an AMR include the entire structure and the component supports discussed above." Therefore, the staff requested the applicant to confirm that all structural elements of the radwaste building are scoped and screened in Table 2.4.7.8. If not, the applicant was requested to list those elements of the radwaste building that are excluded from the table and discuss the basis for their exclusion including BFN's assessment of the II/I implication of the excluded elements upon their adjacent in-scope elements pursuant to 10 CFR 54.4 (a)(2).

In its response, by letter dated April 14, 2005, the applicant stated that all structural elements of the radwaste building are scoped and screened in LRA Table 2.4.7.8.

The staff found the above response to RAI 2.4-15 acceptable. Therefore, the staff's concern described in RAI 2.4-15 is resolved.

#### 2.4.7.8.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the radwaste building components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the radwaste building components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.4.7.9 Service Building**

##### 2.4.7.9.1 Summary of Technical Information in the Application

In LRA Section 2.4.7.9, the applicant identified the structures and components of the service building that are subject to an AMR for license renewal.

This structure consists of exterior concrete walls and footings with an interior structural steel frame supported by concrete footings and floor slabs. The building provides office and shop areas for various onsite organizations.

In LRA Table 2.4.7.9, the applicant identified the following service building component types that are within the scope of license renewal and subject to an AMR:

- masonry block
- metal roofing
- reinforced concrete beams, columns, walls, and slabs
- roof membrane
- structural steel beams, columns, plates, and trusses

##### 2.4.7.9.2 Staff Evaluation

The staff reviewed LRA Section 2.4.7.9 and UFSAR Section 12.2.6.2 using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.7.9 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-16, dated March 25, 2005, the staff stated that LRA Section 2.4.7.9 seems to indicate that only a portion of the service building is scoped and screened in LRA Table 2.4.7.9. Since the LRA provides only a general description of the boundaries between the in-scope and out-of-scope structural elements of the service building, the staff requested the applicant to list those elements of the service building that are excluded from the table and discuss the basis for their exclusion including BFN's assessment of the II/I implication of the excluded elements upon their adjacent in-scope elements pursuant to 10 CFR 54.4 (a)(2).

In its response, by letter dated April 14, 2005, the applicant stated:

During the scoping and screening of the Service Building for the newly identified mechanical systems discussed in the response to RAI 2.1-2A(3), only a limited area of the Service Building contained the new in-scope mechanical piping. Based on that fact, it was determined that the entire structure did not need to be within the scope of license renewal for the period of extended operation and this is described in the second paragraph of the response as noted on page E3-9 and reads as following; "The Service Building contains CO<sub>2</sub> piping and a liquid (water) filled piping for the fire protection system that are required to support fire protection requirements (10 CFR 50.48) based on the criterion of 10 CFR 54.4 (a)(3). Only those rooms of the Service Building that contain the fire protection piping are required to provide structural support and shelter/protection to support the intended function of the fire protection piping."

In order to maintain the structural integrity of the structure within the scope of license renewal and provide reasonable assurance that these piping systems will be able to perform their intended functions, a portion of the structure was required to be in-scope such that the structure will perform its intended functions of "shelter/protection" and "structural support" of 10 CFR 54.4(a)(3) components. The in-scope boundary of the Service Building is described in the second paragraph on page E3-10 and reads as following; "In order to maintain the structural integrity of the Service Building to provide its intended functions for the in-scope components, the building area considered in-scope for the structure will be extended two column line bays in the west direction to column line S4 and will include the entire structure in the north-south direction between the personnel corridors on elevations 565.0' and 580.0' and roof at elevation 595.0' south of column line Sa to the north exterior wall of the Service Building. It should be noted that column line S7 is the east exterior wall of the Service Building and is located adjacent and parallel to the west exterior wall of the Unit 1 turbine building. Additionally, from the foundation slab at EL 565.0' (top of floor slab EL 565.0') to the general roof deck of the structure at EL 595.0' and to EL 605.0' above the mechanical equipment room located between column lines S5 and S6 (west to east) and the Pull-Out Space & Shop Storage between column lines S6 and S7 (west to east) and between column lines Sb to approximately 6 ft north of column line Sh (south to north) defines the in-scope height of the structure." The basis for concluding that the structural integrity boundary of the in-scope structure will be maintained is based on a review of the design of the Service Building.

The structural elements of the Service Building that are listed in Table 2.4.7.9 encompass all the structural elements of the Service Building and none were excluded.

The staff found the above response to RAI 2.4-16 acceptable. Therefore, the staff's concern described in RAI 2.4-16 is resolved.

#### 2.4.7.9.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI response described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the service building components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the service building components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.4.8 Structures and Component Supports Commodities**

#### ***2.4.8.1 Structures and Component Supports Commodity Group***

##### 2.4.8.1.1 Summary of Technical Information in the Application

In LRA Section 2.4.8.1, the applicant described the structures and component supports commodity group. This group includes specific types of structures and component support elements located in structures that are within the scope of license renewal. Physical interfaces exist with the structure, system or component being supported and with the building structural element to which the support is anchored. The supports located within a structure that are included within the scope of license renewal are identified under the individual structure's description. The in-scope items include support members, welds, bolted connections, anchorage (including base plate and grout) to the building structure, spring hangers, guides, and building concrete at bolt locations.

The component supports commodity group includes the following sub-groups: (1) supports for ASME piping and components (GALL Report Items III.B1); (2) supports for cable trays, conduit, HVAC ducts, tube track, instrument tubing and non-ASME piping and components (GALL Report Items III.B2); (3) anchorage of racks, panels, cabinets, and enclosures for electrical equipment and instrumentation (GALL Report Items III.B3); (4) supports for emergency diesel generator (EDG), HVAC system components, and miscellaneous mechanical equipment (GALL Report Items III.B4); and (5) supports for platforms, pipe whip restraints, jet impingement shields, masonry walls, and other miscellaneous structures (GALL Report Items III.B5). The first sub-group includes the supports and support anchorage for ASME-equivalent code class piping and components, or for the components that comprise the interface between the structure and the mechanical component. The second sub-group includes the supports and support anchorage for cable trays, conduits, HVAC ducts, tube track, instrument tubing, and non-ASME piping and components that comprise the interface between the structure and the mechanical, electrical, or instrument component. The third sub-group includes the supports and

support anchorage for enclosures of various types that contain and support electrical equipment. Components evaluated in this group comprise the interface between the structure and the electrical or instrument component. The fourth sub-group includes the supports and support anchorage for equipment not addressed in the previous groups that comprise the boundary between the structure and the component. Finally, the fifth sub-group includes structures and anchorage for miscellaneous structures as described above that indirectly support operation. These components comprise the evaluated structure and its anchorage.

A primary function of a support is to provide anchorage for the supported element for DBEs so that the supported element can perform its intended function or functions.

In LRA Table 2.4.8.1, the applicant identified the following structures and component supports commodity group items that are within the scope of license renewal and subject to an AMR:

- ASME-equivalent supports and components
- bolting and fasteners
- cable trays and supports
- conduit and supports
- duct banks and manholes
- electrical panels, racks, cabinets, and other enclosures
- equipment supports and foundations
- HVAC duct supports
- instrument line supports
- instrument racks, frames, panels, and enclosures
- non-ASME equivalent supports and components
- pipe whip restraints and jet impingement shields
- reinforced concrete beams, columns, walls, and slabs
- stairs, platforms, and grating supports
- trenches
- tube rack
- tunnels

#### 2.4.8.1.2 Staff Evaluation

The staff reviewed LRA Section 2.4.8.1, UFSAR Section 5.2 and Appendix C using the evaluation methodology described in SER Section 2.4. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.4.

In conducting its review, the staff evaluated the structural component functions described in the LRA and UFSAR in accordance with the requirements of 10 CFR 54.4(a) to verify that the applicant had not omitted from the scope of license renewal any components with intended functions delineated under 10 CFR 54.4(a). The staff then reviewed those components that the applicant had identified as being within the scope of license renewal to verify that the applicant had not omitted any passive and long-lived components that should be subject to an AMR in accordance with the requirements of 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.4.8.1 identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

In RAI 2.4-13, dated December 20, 2004, the staff stated that the information provided in LRA Section 2.4.8.1 did not make it clear to the staff that all component supports within the scope of license renewal are included in the component supports commodity group. Therefore, the staff requested clarification for several components listed in LRA Table 2.4.8.1. The staff requested the applicant to provide the following:

- a. Clarify whether the ASME equivalent supports and components listed in Table 2.4.8.1 include the reactor vessel support skirt/support ring and reactor vessel upper lateral stabilizer support. If not, the applicant was requested (1) to explain where these supports were addressed in the LRA, and (2) to submit the technical basis for crediting an alternate AMP for these supports, if they are not managed by ASME Section XI, Subsection IWF.
- b. Clarify whether the ASME Equivalent Supports and Components of LRA Table 2.4.8.1 include the drywell lower ring support and the drywell upper lateral support. If the drywell supports are not managed by ASME Section XI, Subsection IWF, the applicant was requested to submit the AMR for them, including the technical basis for this exception.
- c. Since LRA Section 2.4.8.1 is not referenced anywhere in LRA Sections 2.3 or 2.4, the applicant was requested to verify that all supports associated with components listed in LRA Sections 2.3 and 2.4.1 through 2.4.7 are included in the component types listed in LRA Table 2.4.8.1. If not, the applicant was requested to identify the supports not included and submit the AMR, including credited AMPs.
- d. Confirm that the "Bolting and Fasteners" listed in LRA Table 2.4.8.1 includes anchors directly installed into concrete.

In its response, by letter dated January 24, 2005, the applicant stated:

- a. The reactor vessel support skirt, reactor vessel support ring girder and reactor vessel upper lateral stabilizer are included with "ASME Equivalent Supports and Components" component group as listed in LRA Table 2.4.8.1. See response to RAI 2.4-2 (f), RAI 2.4-2 (g) and 2.4-2 (a) for AMR results for these components respectfully.
- b. The ASME Equivalent Supports and Components of Table 2.4.8.1 do not include the drywell lower ring support and the drywell upper lateral support. Steel Containment Elements in Table 2.4.1.1 include the drywell lower ring support (drywell support skirt) and the drywell upper lateral supports. These components are classified as part of Class MC and BFN is not required to inspect MC supports in accordance with ASME Section XI. Refer to NRC RAIs B.2.1.33-1 and B.2.1.33-2 and TVA's responses to those RAIs for justification of why they are not inspected to ASME Section XI, Subsection IWF. The drywell lower ring support is inaccessible (embedded in the Reactor Building concrete).
- c. LRA Section 2.4.8, "Structures and Component Supports Commodities," includes all supports associated with the components listed in LRA Sections 2.3 and 2.4.1 through 2.4.7, with one exception:
  - (1) LRA Table 2.3.1.2 of Section 2.3.1.2 identifies various components internal to the reactor vessel that provide support for other internal

components. Aging management of reactor vessel internals components is presented in LRA Table 3.1.2.2.

- d. In LRA Table 2.4.8.1, the component group “Bolting and Fasteners” was included in error and should be deleted from the table. LRA Table 2.4.8.1 should read as shown below:

LRA Table 2.4.8.1 - Structures and Component Supports

<u>Component Type</u>	<u>Intended Functions</u>
ASME Equivalent Supports and Components	SS
Cable Trays and Supports	SS, and/or SS(NSR)
Conduit and Supports	SP, SS, and/or SS(NSR)
Duct Banks, Manholes	SS
Electrical Panels, Racks, Cabinets, and Other Enclosures	SP, SS, and/or SS(NSR)
Equipment Supports and Foundations	SS, and/or SS(NSR)
HVAC Duct Supports	SS, and/or SS(NSR)
Instrument Line Supports	SS, and/or SS(NSR)
Instrument Racks, Frames, Panels & Enclosures	SP, SS, and/or SS(NSR)
Non-ASME Equivalent Supports and Components	SS, and/or SS(NSR)
Pipe Whip Restraints and Jet Impingement Shields	PW and/or HE/ME
Reinforced Concrete Beams, Columns, Walls, and Slabs	SS, and/or SS(NSR)
Stairs, Platforms, Grating Supports	SS, and/or SS(NSR)
Trenches	SS(NSR)
Tube Track	SS, and/or SS(NSR)
Tunnels	SS, and/or SS(NSR)

Each of the component support commodity groups identified in LRA section 2.4.8.1 includes bolting and anchors, including anchors installed into concrete. This information has been provided in the discussion for the five Structures and Component Supports Commodity Groups in LRA Section 2.4.8, pages 2.4-55 and 2.4-56.

Item (b) of the above response refers to the applicant’s response to RAIs B.2.1.33-1 and B.2.1.33-2, and the applicant’s justification for why the drywell lower ring support and the drywell upper lateral support are not inspected to ASME Section XI, Subsection IWF. The staff evaluation covering the applicant’s response to RAIs B.2.1.33-1 and B.2.1.33-2 is provided in SER Section 3.0.3.2.21.

The staff found that the applicant response, above, fully addressed the concerns identified in RAI 2.4-13; therefore, the staff’s concern described in RAI 2.4-13 is resolved.

In RAI 2.4-14, dated December 20, 2004, the staff stated that based on information provided in LRA Section 2.4, the staff could not identify the insulation and insulation jacketing included within the scope of license renewal nor the specific subsets of insulation and insulation jacketing that are included in LRA Section 2.4 tables. It was also unclear whether insulation and jacketing on the reactor coolant system had been included; therefore, the staff requested the following of the applicant:

- Identify the structures and structural components designated as within the license renewal scope that have insulation and/or insulation jacketing, and identify their location in the plant.
- List all insulation and insulation jacketing materials associated with the item (a) above that require an AMR and the results of the AMR for each.
- For insulation and insulation jacketing materials associated with the item (a) above that do not require aging management, submit the technical basis for this conclusion, including plant-specific operating experience.
- For insulation and insulation jacketing materials associated with the item (a) above that require aging management, identify the AMP(s) credited to manage aging.

In its response, by letter dated January 24, 2005, the applicant stated:

As stated in Section 2.1.7.2 of the Application, Insulation at BFN does not have an intended function within the scope of 10 CFR 54.4(a)(3).

In its response, by letter May 18, 2005, the applicant provided follow-up information to address the staff's concern that insulation was not in scope and subject to an AMR, as stated below:

Thermal insulation is in scope and meets the criteria of 10 CFR 54.4(a)(2) and 10 CFR 54.4(a)(3).

The AMR results for insulation/insulation jacketing are provided in the new Section 3.0.2, shown in Attachment 2 to this response.

The staff found the above response to RAI 2.4-14 acceptable. Therefore, the staff's concern described above is resolved.

#### 2.4.8.1.3 Conclusion

The staff reviewed the LRA, related structural components, and RAI responses described above to determine whether any SSCs that should be within the scope of license renewal had not been identified by the applicant. No omissions were identified. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that there is reasonable assurance that the applicant had adequately identified the structures and component supports commodity group components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the structures and component supports commodity group components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.4.9 Conclusion

On the basis of its review, the staff concluded that the applicant had adequately identified the structures and components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the BFN structures and components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

## **2.5 Scoping and Screening Results: Electrical and Instrumentation and Controls Systems**

This section documents the staff's review of the applicant's scoping and screening results for electrical and I&C systems.

In accordance with the requirements of 10 CFR 54.21(a)(1), the applicant must identify and list passive, long-lived electrical and I&C SSCs that are within the scope of license renewal and subject to an AMR. To verify that the applicant properly implemented its methodology, the staff focused its review on the implementation results. This approach allowed the staff to confirm that there were no omissions of electrical and I&C system components that meet the scoping criteria and are subject to an AMR.

**Staff Evaluation Methodology.** The staff's evaluation of the information provided in the LRA was performed in the same manner for all electrical and I&C systems. The objective of the review was to determine if the components and supporting structures for a specific electrical and I&C system that appeared to meet the scoping criteria specified in the Rule had been identified by the applicant as within the scope of license renewal, in accordance with 10 CFR 54.4. Similarly, the staff evaluated the applicant's screening results to verify that all long-lived, passive components were subject to an AMR in accordance with 10 CFR 54.21(a)(1).

**Scoping.** To perform its evaluation, the staff reviewed the applicable LRA section and associated component drawings, focusing its review on components that had not been identified as within the scope of license renewal. The staff reviewed relevant licensing basis documents, including the UFSAR, for each electrical and I&C system component to determine if the applicant had omitted components with intended functions delineated under 10 CFR 54.4(a) from the scope of license renewal. The staff also reviewed the licensing basis documents to determine if all intended functions delineated under 10 CFR 54.4(a) had been specified in the LRA. If omissions were identified, the staff requested additional information to resolve the discrepancies.

**Screening.** Once the staff completed its review of the scoping results, it evaluated the applicant's screening results. For those systems and components with intended functions, the staff sought to determine (1) if the functions are performed with moving parts or a change in configuration or properties, or (2) if they are subject to replacement based on a qualified life or specified time period, as described in 10 CFR 54.21(a)(1). For those that did not meet either of these criteria, the staff sought to confirm that these electrical and I&C systems and components were subject to an AMR as required by 10 CFR 54.21(a)(1). If discrepancies were identified, the staff requested additional information to resolve them.

### **2.5.1 Electrical and Instrumentation and Control Commodities**

#### ***2.5.1.1 Summary of Technical Information in the Application***

In LRA Section 2.5.1, the applicant described the electrical and I&C commodities. The electrical and I&C commodities have intended functions to power and control components that meet the requirements of 10 CFR 54.4. For this section, the applicant performed component-level scoping, evaluating by commodities rather than by system components.

The electrical and I&C commodities contain SR components that are relied on to remain functional during, and following, design-basis events. The failure of NSR SSCs in the electrical and I&C commodities could prevent the satisfactory accomplishment of an SR function. In addition, the electrical and I&C commodities perform functions that support fire protection, EQ, ATWS, and SBO.

The intended functions within the scope of license renewal include the following:

- conducts electrical current
- provides electrical insulation
- provides structural support

In LRA Table 2.5.1, the applicant identified the following electrical and I&C commodities component types that are within the scope of license renewal and subject to an AMR:

- bus (with enclosures), transmission conductors, and high-voltage insulators (metallic portions)
- bus and high-voltage insulators (non-metallic portions)
- electrical cables and connections not subject to 10 CFR 50.49 EQ requirements (connections include connectors, splices, terminal blocks, fuse blocks/clips, and electrical/I&C penetration assembly pigtails and connectors)
- various electrical equipment subject to 10 CFR 50.49 EQ requirements

#### **2.5.1.2 Staff Evaluation**

The staff reviewed LRA Section 2.5.1 using the evaluation methodology described in SER Section 2.5. The scoping and screening of electrical and I&C components were performed using the spaces approach described in LRA Section 2.1. The staff conducted its review in accordance with the guidance described in SRP-LR Section 2.5, "Scoping and Screening Results - Electrical and Instrumentation and Controls Systems."

In the performance of the review, the staff reviewed the UFSAR for any functions delineated under 10 CFR 54.4(a) that had not been identified as intended functions in the LRA, to verify that the SSCs with such functions will be adequately managed to maintain the functions consistent with the CLB for the extended period of operation. The staff then reviewed the LRA to verify that passive or long-lived components were subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In LRA Section 2.5.1, the applicant said that the electrical commodities meet the requirements of 10 CFR 54.4(a)(1), 10 CFR 54.4(a)(2), and 10 CFR 54.4(a)(3) and the related requirements for fire protection, EQ, ATWS, and SBO. During its review, the staff identified AMRs for components that are not explicitly addressed for Unit 1. These AMR items are those identified in the scoping and screening evaluation corresponding to LRA Appendices F3, F4, and F7, items shown with a bold-bordered enclosures in LRA Appendix F (see SER Sections 2.6.1.3, 2.6.1.4, and 2.6.1.7). In a letter dated October 8, 2004, the staff requested additional information required for the AMR with respect to these Unit 1 items.

In response to a generic RAI dated January 31, 2005, the applicant provided additional information concerning integration of Unit 1 Restart and License Renewal Activities, which states

The license renewal application was structured to reflect the configuration and current licensing basis of all three units. Scoping and screening as well as aging management reviews were done based on the current licensing bases and configuration of all three units. The differences between the units that are relevant to the application and will be resolved prior to Unit 1 restart, are listed in Appendix F. As each activity identified in Appendix F is completed, the corresponding highlighted (bolded bordered) text in the license renewal application will apply to Unit 1. The only change to the application will be to remove the bolded border. No changes are required to scoping and screening results, aging management review results, or TLAAs. In some cases, boundary drawings would change to reflect the bolded bordered text.

The staff reviewed the applicant's response for these items and accepts the methodology as proposed by the applicant for these bold-bordered items throughout the LRA. These modifications are currently not physically implemented for Unit 1 to match Units 2 and 3 CLB. However, the applicant stated in its response that the scoping and screening as well as the AMRs are done forward-looking for these bold-bordered enclosure items, based on the CLB for Units 2 and 3, which will also apply to Unit 1 when the modifications are completed. As each activity identified in Appendix F is completed, the corresponding bold-bordered text in the LRA will apply to Unit 1. The applicant commits to update the status of this implementation in a future submittal and through the annual LRA update to the CLB, the next one in January 2006. This commitment will be tracked through a temporary instruction (TI)-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. The applicant also committed to inform the staff as these activities are completed and to reflect the status in annual and other periodic updates. Based on the above, the staff finds this issue for the electrical and I&C resolved.

In reviewing LRA Section 2.5, the staff identified areas in which additional information was necessary to com

plete the evaluation of the applicant's scoping and screening results. Therefore, the staff issued RAIs concerning the specific issues to determine whether the applicant had properly applied the scoping criteria of 10 CFR 54.4(a) and the screening criteria of 10 CFR 54.21(a)(1). The following discussion describes the staff's RAIs and the applicant's related responses.

In RAI 2.5-1, dated November 1, 2004, the staff stated that in LRA Section 2.5-1, the applicant stated that scoping and screening of electrical and I&C components was performed using the spaces approach described in LRA Section 2.1. Therefore, the staff requested the applicant to specify if all plant spaces had been evaluated using this methodology. If any spaces had been excluded from this evaluation, the staff asked the applicant to identify the excluded spaces and to explain why the spaces were excluded.

In its response, by letter December 1, 2004, the applicant stated:

The "spaces" approach was used for scoping and screening of all plant spaces. The only time the "spaces" approach was not utilized was scoping and screening of the SBO

recovery path. The “intended function” approach was utilized to identify which specific components were required for SBO recovery.

The staff found this response acceptable; therefore, the staff’s concern described in RAI 2.5-1 is resolved.

In RAI 2.5-2, dated November 1, 2004, the staff noted that in LRA Section 2.1.5.2 the applicant had stated that if a component in a commodity group existed in an area where the area conditions exceeded the commodity group’s limiting environmental parameters, a further evaluation could be performed to determine if the component was required for an intended function of a system within the scope of license renewal. Therefore, the staff requested the applicant to identify all the components that were excluded from the scope of license renewal as a result of these further evaluations and to provide the basis used for excluding each component.

By letter of December 1, 2004, the applicant responded as follows:

The following cables or cable types were scoped in by the “spaces” approach but screened out of the scope of license renewal using further evaluations:

Cable Type THHN is PVC [polyvinyl chloride] insulated lighting wire - THHN lighting wire was used in one circuit in the Drywell for normal lighting. This circuit is not required for Appendix R or SBO lighting and was screened out of the scope of license renewal.

Cable Type TW is a PVC insulated ground wire - BFN uses an ungrounded electrical system thus equipment grounds are for personnel protection only and degradation of the PVC insulation would not adversely affect equipment operation.

The Safe Shutdown Analysis does not list any safety-related intended functions for Source Range Monitors (SRMs) and Intermediate Range Monitors (IRMs) Nuclear Instrumentation. Therefore, the Source Range and the Intermediate Range Nuclear Instrumentation circuitry are screened out and are not subject to an AMR.

The Safe Shutdown Analysis does not list any safety-related functions associated with the Rod Block Monitors (RBMs). Therefore, the RBM circuitry is screened out and is not subject to an AMR.

The only safety-related functions listed in the Safe Shutdown Analysis for the Traversing Incore Probe system (TIP) is provide a reactor coolant pressure boundary. Therefore, TIP circuitry is screened out and is not subject to an AMR.

The following inaccessible medium-voltage cables located in underground conduit duct banks were screened out and not subject to an AMR since they do not perform an intended function for license renewal as specified by 10 CFR 54.4.

- Cables routed to Off-gas Treatment Building Transformers A & B
- Cables routed from the Condensate Circulating Water Pumps to the Condensate Circulating Water Pump (CCWP) capacitor banks
- Cables routed to Cooling Tower equipment

The staff found the exclusions and the reasons for the exclusions from the scope of license renewal acceptable for all the components except the source range monitor (SRM) and intermediate range monitor (IRM) cables, and the cables routed to off-gas treatment building transformers A and B. In an email dated December 15, 2004, the staff asked the applicant for a further response to RAI 2.5-2, clarifying why these components had been excluded from the scope of license renewal.

The staff contended that nuclear instrumentation circuits cannot be screened out since these circuits perform a safety function and provide trip signals to prevent any fuel damage during low power operations. The staff, in support of this item, cited the applicant's statement in LRA Section 2.3.3.32: "The Neutron Monitoring System detects conditions that could lead to local fuel damage and provides signals that can be used to prevent such damage."

With regard to the SRM circuit cables, the staff concurred with the applicant that, because the SRM circuit cables are not designated as SR and they are not in the technical specification for BFN, they do not require an AMR.

With regard to the IRM nuclear instrumentation circuitry, the applicant agreed with the staff that IRM instrumentation circuit cables should be within the scope of license renewal because they are part of the BFN technical specification. Because of this inclusion, the applicant confirmed that their aging effects should be managed by the Electrical Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program. All other accessible neutron monitoring subsystem cables and connections will be managed by the Accessible Non-Environmental Qualification Cables and Connections Inspection Program. This inclusion impacts the scope of the AMP's elements "Program Description" and "NUREG-1801 Consistency." These changes have been added to the SER Appendix A commitment table, and the applicant will modify the UFSAR supplement to reflect these changes.

With regard to the exclusion of cables routed to off-gas treatment building transformers A and B because they did not serve any intended function, the staff identified technical information in LRA Section 2.3.3.19 that stated that the off-gas system is within the scope of license renewal in accordance with 10 CFR 54.4(a). The SR functions of the off-gas system are to provide flow path integrity for the release of the filtered standby gas treatment system gases to the stack, and to provide automatic closure of back-draft prevention dampers to prevent back flow and potential ground-level release of radiation. Therefore, the staff contended that cables routed to off-gas treatment building transformers A & B cannot be screened out.

In its response dated January 18, 2005, the applicant stated that in performing SR functions the off-gas system relies solely on mechanical components that do not require electrical power. Therefore, the applicant stated that medium-voltage cables routed to off-gas treatment building transformers A and B are screened out and not subject to an AMR.

The staff concurred with the applicant's response dated January 18, 2005, that the intended functions of the off-gas system addressed in LRA Section 2.3.3.19 are accomplished through mechanical means without electrical power. However, the fans of the standby gas treatment system listed in LRA Section 2.3.2.2 are within the scope of license renewal and are powered by these transformers. Therefore, the cables listed in LRA Section 2.3.2.2 as being in the standby gas treatment system should be within the scope of license renewal.

Based on the above, the staff identified additional follow-up to RAI 2.5-2. In an informal request on January 31, 2005, the staff requested clarifications on why these medium-voltage cables to off-gas treatment building transformers A and B had been screened out.

In its response to clarifications to follow up to RAI 2.5-2, by letter dated March 2, 2005, the applicant stated that standby gas treatment blowers, which are within the scope for license renewal, are not powered from off-gas treatment building transformer A and B. The applicant stated that the standby gas treatment system and the off-gas treatment system are completely different systems, independent of each other and located in different buildings that do not share power distribution systems or equipment. Standby gas treatment blowers, which are in scope for license renewal, are not powered from off-gas treatment building transformers A and B. In its response dated March 2, 2005, the applicant also provided details of the electrical circuits that support its contention that these blowers are not powered from the above transformers. The staff was satisfied with the explanation and considers this issue resolved.

On the basis of its review, the staff found that the applicant had adequately addressed all of the staff's concerns raised in RAI 2.5-2. Therefore, the staff's concerns described in RAI 2.5-2 are resolved.

In RAI 2.5-3, dated November 1, 2004, the staff requested additional information regarding the three license renewal drawings identified in LRA Section 2.5.1 that depict the recovery path for SBO and identify the location of each commodity group component in the recovery path circuit.

In its response, by letter December 1, 2004, the applicant properly identified the location of each commodity group component in the SBO recovery path. The response includes details from the 500 kV switchyard to the 4kV shutdown boards for all three units, transmission conductor runs between breakers, and isolated phase bus runs between the main transformers and the unit station service transformers. The applicant also stated that the SBO recovery path circuits include control circuit wiring. The low-voltage power and control circuit wiring associated with the power circuit breakers and disconnects are included within the scope of license renewal, and there are no 500kV, 161kV, or 4kV underground power circuits used in SBO recovery paths. These details are documented in its response.

The staff found these details were in order and on the basis of its review, the staff found the applicant's response acceptable. Therefore, the staff's concern described in RAI 2.5-3 is resolved.

In RAI 2.5-4, dated November 1, 2004, the staff stated that during a teleconference held on July 28, 2004, in response to a request for additional information, RAI 3.6-3, the applicant stated that in 1997 a cross-linked polyethylene (XLPE)-insulated CCWP capacitor bank cable failed in-service at BFN. Therefore, the staff requested that the applicant explain why these

cables were not included within the scope of license renewal and identified as a component that requires an AMR.

In its response to RAI 2.5-4, the applicant stated that the condensate circulating water (CCW) system (system 027) is within the scope of license renewal because it provides manual vacuum breaking capability to prevent backflow from the cooling tower warm channel into the forebay upon trip of the CCW pumps. The capacitor bank provides additional starting power for the condenser circulating water pumps to minimize loading on the electrical distribution system. But, as previously stated in the response to RAI 2.5-2, above, the CCWP capacitor bank cables are medium-voltage cables that do not perform an intended function for license renewal as specified in 10 CFR 54.4. The staff had previously accepted the applicant's position that these cables are screened out and not subject to an AMR.

On the basis of its review, the staff found that the applicant had adequately addressed the staff's concern. Therefore, the staff's concern described in RAI 2.5-4 is resolved.

#### **2.5.1.3 Conclusion**

During its review of the information provided in the LRA, RAI responses, and the UFSAR, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for electrical and I&C commodities. In addition, the staff performed a review to determine whether any components that should be subject to an AMR had not been identified by the applicant. No omissions were identified. On the basis of its review, the staff concluded that the applicant had adequately identified the electrical and I&C commodities components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and the electrical and I&C commodities components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

## **2.6 Integration of Browns Ferry Nuclear, Unit 1, Restart Activities and License Renewal Activities**

BFN was designed and constructed by the applicant and licensed in 1973, 1974, and 1976 respectively. The three units are identical GE BWR/4 reactors with Mark I containments. The units operated from original licensing until 1985 when they were voluntarily shut down by the applicant to address management and technical issues. The applicant then implemented a comprehensive nuclear performance plan to correct the deficiencies that led to the shutdown. This plan included changes in management, programs, processes, and procedures, as well as extensive equipment refurbishment, replacement, and modifications. Unit 2 was subsequently restarted in 1991, and Unit 3 followed in 1995. In the early 1990s, the applicant decided to defer restart of Unit 1. On May 16, 2002, the applicant announced the Unit 1 restart project. The applicant had previously notified the staff of its intent to submit an LRA for Units 2 and 3 by December 31, 2003. The applicant met with the staff on July 24, 2002, to discuss its proposal to submit the LRA for all three units. Subsequent meetings were held with the staff on October 31, 2002, April 23, 2003, and September 29, 2003. Meeting summaries are documented by letters dated November 25, 2002, June 2, 2003, and October 30, 2003, respectively, regarding the license renewal application. In those meetings, agreement was reached with the staff on the content and format of the application to ensure that it met all regulatory requirements and supported staff review.

License Renewal Application Content. In the meetings referenced above, the applicant explained that, although it was engaging in numerous plant modifications and restart activities, the CLB for Unit 1 was well-known, defined, and documented, and the LRA would be prepared based on the CLB. The unique element with Unit 1 is that restart activities include modifying the Unit 1 licensing basis to make it consistent with the CLB of Units 2 and 3. During the meetings with the staff, it was agreed the applicant would identify in the LRA the Unit 1 differences that will be eliminated when restart activities are completed. To highlight these differences, information not yet applicable to Unit 1 was marked with a bolded border. This annotation methodology is consistent with previous multi-plant LRAs submitted to the staff. LRA Appendix F describes each of these differences, its effect on the application, and the schedule for resolution. It also provides references to application sections affected. This enabled the applicant to submit an LRA based on the CLB for all three units, as well as to identify Unit 1 restart activities relevant to the LRA. As previously stated, the BFN units are essentially identical, and the application is not unit-specific with regard to AMPs. The changes being implemented as part of Unit 1 restart activities are consistent with the changes made previously to Units 2 and 3. The AMPs are common for all three units because at restart the Unit 1 licensing basis will be the same as the licensing basis for Units 2 and 3.

### **2.6.1 Regulatory Framework for Review of BFN LRA and Integration Unit 1 Restart Activities**

By letter dated December 31, 2003, the applicant submitted an application pursuant to 10 CFR 54 to renew the operating licenses for the BFN Units 1, 2, and 3. The applicant is submitting additional information concerning the status of Unit 1 restart activities and the impact of those activities on the LRA. LRA Appendix F states that the Unit 1 restart program will result in three operationally identical BFN units, providing assurance that the Unit 1 CLB changes implemented prior to restart will result in the same CLB as that of Units 2 and 3 and that,

therefore, the AMPs for each unit are the same. The Unit 1 CLB differences described in LRA Appendix F will be resolved prior to Unit 1 restart.

BFN has a single UFSAR common to all three units. Unit 1 has been maintained in essentially the same physical configuration as it was when it was shut down in 1985 (except for systems required to keep Unit 1 in the shutdown condition or to support Units 2 and 3 operation). As required by 10 CFR 50.71, the UFSAR was updated for all three units when amendments were issued common to all the units. In 1998, the Unit 1 Technical Specifications were converted to Improved Technical Specifications, as they were for Units 2 and 3. The license renewal UFSAR supplement Appendix A identifies and describes the AMPs that are required for all three units. No AMPs unique to Unit 1 are required during the period of extended operation. However, for portions of Unit 1 systems that have not been replaced, the staff concluded that there was insufficient operating history or data to conclude that one-time inspections are appropriate substitutes for periodic inspections. Based on the advice from the interim review by the ACRS in its 526th subcommittee meeting and in resolving the staff concerns in this matter, AMP B.2.1.42, "Unit 1 Periodic Inspection Program," was added to supplement one-time inspections. The committee also felt that periodic inspections are the most significant compensating actions for the lack of plant-specific operating experience of BFN Unit 1. This new AMP is only applicable to Unit 1 and was added as a result of the staff reaching an agreement with the applicant for managing piping and components left in place, specifically, the ones subjected to the layup program.

The LRA was structured to reflect the configuration and CLB of all three units. Scoping and screening as well as AMRs were done based on the configuration and CLB of all three units. The differences between the units that are relevant to the application, and which will be resolved prior to Unit 1 restart, are listed in LRA Appendix F.

As each activity identified in LRA Appendix F is completed, the corresponding highlighted (bold-bordered) text in the LRA will apply to Unit 1. The only change to the application will be to remove the bolded border. No changes are required to scoping and screening results, AMR results, or TLAAs. In some cases, boundary drawings would change to reflect the bold-bordered text. Accordingly, the staff reviewed all the bold-bordered items in the LRA as they will exist when Unit 1 restarts. The staff review of Unit 1 items focused on the material, aging effect, and AMPs as they exist in Units 2 and 3. There was no unique impact of these evaluations on Unit 1 items, because the applicant stated that there were no unique AMPs for Unit 1. The BFN procedures for AMPs apply site-wide and BFN procedures for new AMPs and AMP enhancements will be issued for all three units.

LRA Appendix F provides the applicant's plans and the schedules for Unit 1 restart activities affecting the LRA. Whenever text shown with a bold-bordered box appears in the LRA, indicating a licensing or design basis that only applies to Units 2 and 3, a link is provided to the appropriate LRA Appendix F section.

LRA Appendix F summarizes the resolution of the differences between Unit 1 and Units 2 and 3. For each difference, the following information is presented:

Description – Describes the difference.

Difference Resolution – Explains the methodologies and activities that the applicant plans to use to disposition each licensing or design-basis difference.

LRA Impact – Summarizes changes that would be expected to the LRA, if the condition were resolved prior to issuance of the renewed licenses.

Schedule for Completion – Relates to milestones rather than specific dates. The schedules reflect the current schedules in the Unit 1 restart plan and are subject to change as the plan is implemented. The following milestones have been defined:

- Prior to renewed license issuance – The applicant expects the resolution activities to be complete prior to the expected issuance date of the renewed licenses.
- Prior to restart – The applicant will complete the resolution activities prior to Unit 1 restart.
- Permanent – The difference is acceptable as-is for license renewal. No changes related to license renewal are necessary or planned for the condition.
- If a submittal is required, the submittal milestone is stated.
- Systems/structures/components impacted – The impacted systems, structures, or components are identified with links to the appropriate sections in LRA Chapter 2 sections and the appropriate LRA Chapter 3 sections.
- AMPs/TLAAs Impacted – The impacted AMPs and TLAAs are identified with links to the appropriate section in LRA Chapter 4 and Appendix B.

Staff Evaluation Methodology. In reviewing the technical information provided in LRA Appendix F, and January 31, 2005, letter, the staff review was limited to verifying (1) the sufficiency of information provided by the applicant for the 13 items that impacted the LRA review, (2) the applicability of the 13 items to Unit 1, (3) the systems these 13 items impacted, and (4) the plan to resolve differences between the CLB for Unit 1 and the CLB for Units 2 and 3, so that upon restart all units will have the same CLB. It should be noted that in the LRA the restart activities listed in LRA Appendix F are generally referred to as differences in the design basis or licensing basis. Based on the definition of CLB in 10 CFR 54.3, these activities are more precisely described as implementation activities of the design and licensing basis. The applicant, by submittal dated March 2, 2006, provided details of previous safety evaluations completed under 10 CFR 50.59, under plant changes that do not require staff approval and agreed to make these evaluations available for an audit if necessary. Even though each of the 13 activities listed in LRA Appendix F is committed to and planned for completion prior to Unit 1 restart, any unimplemented commitments would remain valid, part of the CLB, carry over into the renewed license period, and be controlled by the NRC regulatory and oversight process.

The staff's evaluation of the information provided in the LRA was performed in the same manner for all mechanical, civil, electrical systems as it relates to the particular item in question. The objective of the review was to determine if the components and supporting structures for a specific mechanical system that appeared to meet the scoping criteria specified in the Rule had been identified by the applicant as being within the scope of license renewal. Similarly, the staff evaluated the applicant's screening results to verify that all long-lived, passive components are subject to an AMR in accordance with 10 CFR 54.21(a)(1).

Specific planned Unit 1 restart activities that impact license renewal are provided below.

#### **2.6.1.1 Main Steam Isolation Valve Alternate Leakage Treatment**

Description. In LRA Section F.1 the applicant described the proposed modification. The Unit 1 CLB for MSIV leakage does not incorporate an alternate leakage treatment pathway utilizing main steam system piping and main condenser. The Unit 1 main steam piping from the outermost isolation valve up to the turbine stop valve, the bypass/drain piping to the main condenser, and the main condenser is being evaluated and will be modified as required to ensure structural integrity is retained during and following an SSE. This will allow use of methodology that assumes plateout and holdup in the piping and condenser (in LOCA offsite and control room dose calculations) for radioactive leakage past the MSIVs. In the LRA, the applicant stated that this methodology was included in the Units 2 and 3 CLB and will be incorporated prior to Unit 1 restart.

Difference Resolution. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved prior to Unit 1 restart by approval of a technical specification change dated July 9, 2004, and implementation of the actions committed to in the proposed change prior to Unit 1 restart. The applicant committed to revise plant operating procedures to provide procedural requirements to establish the alternate leakage treatment path to the condenser and to resolve the outliers identified in the supporting analysis.

LRA Impact. The Unit 1 systems and structures impacted by this modification and their LRA sections and tables:

- high pressure coolant injection (Section 2.3.2.3)
- auxiliary boiler (Section 2.3.3.1)
- sampling and water quality (Section 2.3.3.14)
- reactor core isolation cooling (Section 2.3.3.23)
- main steam (Section 2.3.4.1 and Table 3.4.2.1)
- condensate and demineralized water (Section 2.3.4.2 and Table 3.4.2.2)
- heater drains and vents (Sections 2.3.4.4 and 3.4.2.1.4 and Table 3.4.2.4)
- turbine drains and miscellaneous piping (Sections 2.3.4.5 and 3.4.2.1.5 and Table 3.4.2.5)
- turbine buildings (Section 2.4.7.1)

Following resolution of this item, the license renewal results shown with a bold-bordered box in the sections identified above will be applicable to Unit 1.

Schedule for Completion. The Unit 1 modification is scheduled for completion prior to restart and currently forecasted to be completed by August 2006. Should the applicant not receive approval of technical specification (TS)-436, the effect on the license renewal is that the Unit 1 components credited in the MSIV alternate leakage pathway will not be within the scope of license renewal as currently planned. The Unit 1 boundary drawings will remain accurate and the increased scope identified by the bold-bordered boxes in the application will not be applicable. Staff reviews of the application would not change.

Staff Evaluation. The applicant evaluated the impacts to the scoping and screening of the affected SSCs because of this Unit 1 restart modification. The applicant stated that after approval of the proposed change (TS-436) and implementation of the actions committed to in the proposed change prior to Unit 1 restart, there will be no functional differences in the alternate leakage treatment pathways between Units 1, 2, and 3. The Unit 1 components that comprise the alternate leakage treatment pathway will be incorporated into the appropriate AMPs specified in the LRA, and there will be no unit-specific differences. The staff also concurred with the applicant's evaluation that there are no changes to the previously evaluated intended function of respective systems and components screened and scoped previously.

In addition, Unit 1 modifications impact LRA Section 2.1 "Scoping and Screening Methodology," which relates to the leakage pathway MSIV's structural integrity. In its response dated May 31, 2005, the applicant provided information related to RAI 2.1-2A(1) and (2) concerning NSR components that affect SR piping regarding the secondary containment integrity and also related to RAIs 2.3.4.4-1 and 2.3.4.4-2. The staff found the applicant's response to RAI 2.1-2A(1) and (2) acceptable; therefore, RAIs 2.3.4.4-1 and 2.3.4.4-2 are closed.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by August 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment be will completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, RAI responses, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the MSIV alternate leakage treatment modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated in SER Section 2.1.3.1.2, and the staff requested additional information. RAIs 2.1-2A(1) and (2) are related to seismic qualification of secondary containment penetration seals. The MSIV alternate treatment modification potential involves one such penetration. The staff in reviewing the structures and components impacted by these modifications concluded that the applicant had adequately identified Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21 (a)(1).

#### **2.6.1.2 Containment Atmosphere Dilution System**

Description. The CAD system consists of six pneumatic valves per unit, each with its own accumulator and check valve. The CAD system was originally designated for short-term use after DBEs. Long-term use (up to 100 days) was not considered in the original design. A request to consider the long-term use of the CAD system was included in NUREG 0737 (TMI action Plan), Item II.K.3.28 (Qualification of CAD Accumulators). The safety evaluation that documents the acceptability of the applicant's plan to satisfy Item II.K.3.28 for all three units was provided previously by letter dated July 24, 1985.

The CAD system must have the capability to supply pressurized nitrogen to operate the main steam relief valves when control air is not available to ensure the safe shutdown requirements of 10 CFR Part 50, Appendix R following fires, and 10 CFR 50.63 during an SBO. That capability has been installed on Units 2 and 3 and will be installed on Unit 1.

Difference Resolution. The differences between Unit 1 versus Units 2 and 3 will be resolved prior to Unit 1 restart by upgrading the Unit 1 CAD accumulator system and implementing its CLB, letter to NRC dated July 12, 1984. The capability to supply pressurized nitrogen to operate the main steam relief valves for the long-term when control air is not available will be provided by splitting the ring header into two sections and providing an alternate nitrogen supply to the drywell control air system.

LRA Impact. The Unit 1 systems and structures impacted by this modification and their LRA sections:

- containment (2.3.2.1)
- containment atmosphere dilution (2.3.2.7)
- control air (2.3.3.10)
- sampling and water quality (2.3.3.14)
- reactor building closed cooling water (2.3.3.22)
- radioactive waste treatment (2.3.3.25)
- feedwater (2.3.4.3)

Following resolution of this item, the license renewal results shown with a bold-bordered box in the sections identified above will be applicable to Unit 1.

Schedule for Completion. The Unit 1 modification is scheduled for completion prior to restart and currently forecasted to be completed by July 2006. Should the applicant not make the modifications discussed above, the associated additional components planned to be installed would not be installed and, therefore, the additional components would not be within the scope of license renewal as currently planned. The Unit 1 boundary drawings would remain accurate and the increased scope identified by the bold-bordered boxes in the application would not be applicable. Staff reviews of the application would not change.

Staff Evaluation. Once the Unit 1 modifications are completed there will be no functional differences in the containment atmosphere dilution nitrogen supply between Units 1, 2, and 3. The Unit 1 components that comprise the containment atmosphere dilution nitrogen supply will be incorporated into the appropriate AMPs specified in the LRA, and there will be no unit-specific differences. As stated above, this modification is forecasted to be completed by July 2006, and it will be duly tracked by a separate LRA Appendix A commitment and LRA inspection prior to Unit 1 restart to confirm implementation.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by August 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

**Conclusion.** During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the containment atmosphere dilution system modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff did not identify any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.6.1.3 Fire Protection**

**Description.** The applicant is required by 10 CFR Part 50, Appendix R to have the capability to maintain safe shutdown during and after a fire at BFN station. The staff issued an SER, dated December 8, 1988, for the 10 CFR Part 50, Appendix R-Fire Protection Program, "Browns Ferry Nuclear Plant, Units 1, 2, and 3 - Appendix R Safe Shutdown System Analysis," and supplemental safety evaluation, dated November 3, 1989, on the subject. In addition, by letter dated March 6, 1991, the staff issued an associated license amendment. The SER for the fire protection plan and fire hazards analysis was provided by staff letter to TVA, "Fire Protection Program - Browns Ferry Nuclear Plant Units 1, 2, and 3," dated March 31, 1993. The applicant's Fire Protection Report, Volume 1 (UFSAR Chapter 10.11), states that the 10 CFR Part 50, Appendix R requirements for operating units have been established and implemented for Units 2 and 3. The staff has also issued a license amendment for the 10 CFR Part 50, Appendix R post-fire safe shutdown program, dated November 2, 1995.

**Difference Resolution.** The differences between the current fire protection licensing basis for Unit 1 and the CLB for Units 2 and 3 will be resolved prior to Unit 1 restart by implementation of the Fire Protection Program on Unit 1.

**LRA Impact.** The Unit 1 systems, structures, and AMPs impacted by this modification and their LRA sections:

- reactor recirculation (2.3.1.4)
- containment (2.3.2.1)
- high pressure coolant injection (2.3.2.3)
- residual heat removal (2.3.2.4)
- containment atmosphere dilution (2.3.2.7)
- residual heat removal service water (2.3.3.3)
- high pressure fire protection (2.3.3.6)
- control air (2.3.3.10)
- sampling and water quality (2.3.3.14)
- emergency equipment cooling water (2.3.3.20)
- reactor water cleanup (2.3.3.21)
- reactor building closed cooling water (2.3.3.22)
- reactor core isolation cooling (2.3.3.23)
- radioactive waste treatment (2.3.3.25)

- fuel pool cooling and cleanup (2.3.3.26)
- control rod drive (2.3.3.29)
- main steam (2.3.4.1)
- condensate and demineralized water (2.3.4.2)
- feedwater (2.3.4.3)
- primary containment structure (2.4.1.1)
- reactor buildings (2.4.2.1)
- turbine buildings (2.4.7.1)
- electrical and instrumentation and control commodities (2.5.1)
- Fire Protection Program (B.2.1.23)
- Fire Water System Program (B.2.1.24)

Following resolution of this item, the license renewal results shown with a bold-bordered box in the sections identified above will be applicable to Unit 1.

It is reasonable to assume that the Fire Protection Program will be implemented prior to Unit 1 restart.

Schedule for Completion. The Unit 1 analyses and modifications are scheduled for completion prior to restart and currently forecasted to be completed by August 2006.

Staff Evaluation. Once the Unit 1 Fire Protection Program modifications are completed there will be no functional differences between Units 1, 2, and 3. The Unit 1 components that comprise the high pressure fire protection system will be incorporated into the appropriate AMPs specified in the LRA and there will be no unit-specific differences. The staff review of Unit 1 items focused on the material, aging effects, and AMPs as they exist in Units 2 and 3, and there were no impacts of the evaluations on Unit 1 items, because the applicant stated that there was no unique AMP for Unit 1. The staff found the explanation acceptable.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by August 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the fire protection modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff did not identify any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.6.1.4 Environmental Qualification**

Description. A site-wide EQ Program required by 10 CFR 50.49 has been developed for BFN, and implemented on Units 2 and 3, and it is expected to be implemented on Unit 1 to ensure compliance with 10 CFR 50.49.

As part of the recovery program for Browns Ferry, by October 24, 1988 letter, the applicant committed to implement its EQ Program so that electrical equipment located in a harsh environment would meet 10 CFR 50.49 requirements prior to the restart of each unit. The safety evaluation for the program was issued by the staff on January 23, 1991. The site-wide EQ Program required by 10 CFR 50.49 was developed for BFN, implemented on Units 2 and 3, and is being implemented on Unit 1. This program defines responsibilities and specifies requirements to establish and maintain auditable documentation demonstrating the environmental qualification of equipment. This program is described in LRA Section 4.4.

The EQ Program:

- Identifies the applicable DBAs and determines the environmental parameters for those accidents. The environmental parameters are necessary for procurement, design, and qualification of equipment in accordance with 10 CFR 50.49.
- Identifies the equipment and cables in the harsh zones within the scope of 10 CFR 50.49 and determines their required operating times.
- Is established or procured and documented for each piece of equipment in the 10 CFR 50.49 list. Environmental Qualification Data Packages provide documented evidence that demonstrates the qualification of each piece of equipment for its specific application and environment. Components subject to 10 CFR 50.49 requirements that are not qualified for the license term must be refurbished, replaced, or have their qualification extended prior to reaching the aging limits established in their evaluation.
- Actions are identified, proceduralized, and initiated to maintain the qualification of installed equipment and cables. This includes periodic, preventive, or corrective maintenance; procurement controls; and storage requirements. The safety evaluation for the program was issued by the staff on January 23, 1991.

Difference Resolution. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved prior to Unit 1 restart by implementation of the EQ Program on Unit 1, as stated in the LRA Sections 4.4 and B.3.1.

UFSAR Impact. The Unit 1 systems, structures, commodities, AMPs, and TLAAs impacted by this modification and its LRA sections and tables:

- reactor recirculation (Section 2.3.1.4)
- containment (Section 2.3.2.1)
- high pressure coolant injection (Section 2.3.2.3)
- residual heat removal (Section 2.3.2.4)
- core spray (Section 2.3.2.5)
- containment inerting (Section 2.3.2.6)

- containment atmosphere dilution (Section 2.3.2.7)
- control air (Section 2.3.3.10)
- sampling and water quality (Section 2.3.3.14)
- emergency equipment cooling water (Section 2.3.3.20)
- reactor water cleanup (Section 2.3.3.21)
- reactor building closed cooling water (Section 2.3.3.22)
- reactor core isolation cooling (Section 2.3.3.23)
- radioactive waste treatment (Section 2.3.3.25)
- control rod drive (Section 2.3.3.29)
- radiation monitoring (Section 2.3.3.31)
- main steam (Section 2.3.4.1)
- feedwater (Section 2.3.4.3)
- primary containment structure (Section 2.4.1.1)
- reactor buildings (Section 2.4.2.1)
- electrical and I&C commodities (Section 2.5.1 and Tables 3.6.1 and 3.6.2.1)
- EQ TLAA (Section 4.4)
- EQ Program (Section B.3.1)

Following resolution of this item, the license renewal results shown with a bold-bordered box in the sections identified above will be applicable to Unit 1.

Schedule for Completion. The Unit 1 analyses and modification is scheduled for completion prior to restart and currently forecasted to be completed by July 2006.

Staff Evaluation. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved prior to Unit 1 restart by implementation of the EQ Program. Once the Unit 1 portion of the EQ Program is completed, the BFN site-wide EQ Program will ensure that the components subject to 10 CFR 50.49 requirements are maintained within the bounds of their qualification bases for the period of extended operation.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by August 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the EQ modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff did not identify any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.6.1.5 Intergranular Stress Corrosion Cracking**

The applicant submitted and implemented plans for addressing intergranular stainless steel stress corrosion cracking in accordance with generic letter (GL) 88-01 and Supplement 1 for Units 2 and 3. In accordance with the Unit 1 restart plan, GL 88-01 will be addressed for Unit 1.

Description. The BWR Stress Corrosion Cracking Program manages IGSCC in reactor coolant pressure boundary components made of stainless steel.

The applicant's program to address GL 88-01, the staff position on IGSCC in BWR austenitic stainless steel piping, for Unit 3 was provided by letter dated December 28, 1992. The applicant, by its letter dated August 1, 1988, previously committed to submit a report containing the details of the repair or replacement work. The safety evaluation documenting the acceptability of the program was provided and supplemental information regarding Unit 1 was submitted by letter dated December 3, 1993. The following wrought austenitic stainless steel piping systems and components on Unit 1 are considered susceptible to IGSCC according to the guidelines given in GL 88-01:

- reactor recirculation from the recirculation inlet and outlet nozzles to the connections with RHR
- RHR from the recirculation system to the first isolation valve outside of the drywell penetration
- reactor water cleanup (RWCU) from its connection to the RHR system to first isolation valve outside of the drywell penetration
- core spray from the core spray inlet nozzles to the drywell penetration, including the core spray inlet safe ends
- jet pump instrument safe ends

In its letter, dated July 21, 2004, the applicant informed the staff that the IGSCC-susceptible piping on Unit 1 is being replaced using materials that are resistant to IGSCC. To address the requirements for inspection schedules and expansion plans, the susceptible weldments have been categorized according to NUREG 0313, Revision 2, Section 5, Table 1. The in-service inspections are required by BFN Technical Requirements Manual, Section 3.4.3.

Difference Resolution. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved Unit 1 prior to restart by the replacement of the IGSCC-susceptible piping, and by providing IGSCC protection or mitigation.

UFSAR Impact. The Unit 1 systems and AMPs impacted by this modification and their LRA sections and table:

- reactor vessel (Section 2.3.1.1)
- reactor recirculation (Section 2.3.1.4)
- residual heat removal (Section 2.3.2.4)
- core spray (Section 2.3.2.5 and Table 3.2.2.5)
- reactor water cleanup (Section 2.3.3.21)

- Boiling Water Reactor Stress Corrosion Cracking Program (B.2.1.10)
- BWR Reactor Water Cleanup System Program (B.2.1.22)

It is reasonable to assume that replacement of the IGSCC-susceptible piping will be performed. The applicant has already removed the original piping and must replace it to operate the unit. Following resolution of this item, the license renewal results shown with a bold-bordered box in the sections identified above will be applicable to Unit 1.

Schedule for Completion. Submittal of the Unit 1 IGSCC plan and implementation report, as well as the physical modification, are scheduled for completion prior to restart and currently forecasted to be completed by March 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not allow the applicant to enter the period of extended operation without implementing this modification.

Staff Evaluation. Once the piping replacement modifications are completed on Unit 1 there will be no functional differences in the IGSCC mitigation or protection between Units 1, 2, and 3. The Unit 1 components that mitigate IGSCC will be incorporated into the appropriate AMPs and there will be no unit-specific differences.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by August 2006. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the IGSCC modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff has not identified any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### ***2.6.1.6 Boiling Water Reactor Vessel and Internals Project Inspection and Flaw Evaluation Guidelines Implementation***

Summary of Technical Information. During Unit 1's extended outage, the BWRVIP was initiated to develop inspection and flaw evaluation guidelines. The following guidelines will be implemented on Unit 1 during its restart.

BWRVIP-03 Reactor Pressure Vessel and Internals Examination Guidelines  
 BWRVIP-05 BWR Reactor Pressure Vessel Shell Weld Inspection Recommendations  
 BWRVIP-06-A Safety Assessment of BWR Reactor Internals  
 BWRVIP-15 Configurations of Safety-Related BWR Reactor Internals  
 BWRVIP-18 BWR Core Spray Internals Inspection and Flaw Evaluation Guidelines

BWRVIP-25 BWR Core Plate Inspection and Flaw Evaluation Guidelines  
BWRVIP-26 BWR Top Guide Inspection and Flaw Evaluation Guidelines  
BWRVIP-27-A BWR Standby Liquid Control System/Core Plate Inspection and Flaw Evaluation Guidelines  
BWRVIP-38 BWR Shroud Support Inspection and Flaw Evaluation Guidelines  
BWRVIP-41 BWR Jet Pump Assembly Inspection and Flaw Evaluation Guidelines  
BWRVIP-47 BWR Lower Plenum Inspection and Flaw Evaluation Guidelines  
BWRVIP-48 Vessel ID Attachment Weld Inspection and Flaw Evaluation  
BWRVIP-49-A Instrument Penetration Inspection and Flaw Evaluation Guidelines  
BWRVIP-74-A BWR Reactor Pressure Vessel Inspection and Flaw Evaluation Guidelines  
BWRVIP-75 Technical Basis for Revisions to Generic Letter 88-01 Inspection Schedules  
BWRVIP-76 BWR Core Shroud Inspection and Flaw Evaluation Guidelines  
BWRVIP-94 Program Implementation Guide  
BWRVIP-104 Evaluation and Recommendations to Address Shroud Support Cracking in BWRs

Difference Resolution. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 with regard to the reactor vessel and internal inspection criteria will be resolved prior to Unit 1 restart by the implementation of the BWRVIP guidelines on Unit 1.

UFSAR Impact. The Unit 1 systems and AMPs impacted by this modification and their LRA sections:

- reactor vessel (3.1.2.2.16)
- reactor vessel internals (3.1.2.2.16)
- Boiling Water Reactor Vessel Inside Diameter Attachment Welds Program (B.2.1.7)
- Boiling Water Reactor Penetrations Program (B.2.1.11)
- Boiling Water Reactor Vessel Internals Program (B.2.1.12)

It is reasonable to assume that the applicant will implement the BWRVIP guidelines. Without continued commitment to the BWRVIP, the applicant would have to independently develop and obtain staff approval of alternate methodologies for Unit 1, which is not economically feasible.

Following resolution of this item, the license renewal results shown with a bold-bordered box in the sections identified above will be applicable to Unit 1.

Schedule for Completion. The Unit 1 modification is scheduled for completion prior to restart and currently forecasted to be completed by November 2005.

Staff Evaluation. Prior to restart of Unit 1, the BWRVIP information included in the application will be implemented on Unit 1.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by November 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the

applicant's scoping and screening results for the structures and components because of the BWRVIP and flaw evaluation guidelines implementation modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff has not identified any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.6.1.7 Anticipated Transients Without Scram**

Description. Section 50.62 of 10 CFR requires applicants to reduce the risk from ATWS events. The applicant adopted the BWR Owners' Group recommendation for implementation of the ATWS rule by letter dated March 1, 1988. The staff approval of the applicant's approach for satisfying 10 CFR 50.62 was provided on January 22, 1989, and the associated TS changes were approved on January 26, 1989. TS 3.3.4.2 for the BFN units provides the requirements for the ATWS recirculation pump trip (ATWS-RPT) instrumentation. TS 3.1.7, SLC system, for the BFN units provides requirements for ATWS that satisfy 10 CFR 50.62. In its letter dated November 29, 1990, the applicant confirmed its commitment to install the required ATWS modifications prior to Unit 1 restart. Design features described in UFSAR Chapter 7.19 will be installed on Unit 1.

Difference Resolution. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved prior to Unit 1 restart by implementation of the ATWS modifications on Unit 1. The CRD system will have a diverse scram (i.e. alternate rod injection) in accordance with LRA Section 2.3.3.29.

UFSAR Impact. The Unit 1 systems, structures, and commodities impacted by this modification and their LRA sections:

- reactor core isolation cooling (2.3.3.23)
- control rod drive (2.3.3.29)
- feedwater (2.3.4.3)
- primary containment structure (2.4.1.1)
- reactor buildings (2.4.2.1)
- electrical and instrumentation and control commodities (2.5.1)

Following resolution of this item, it is expected that the license renewal results shown with a bold-bordered box in the sections identified above will be applicable to Unit 1.

Schedule for Completion. The Unit 1 analyses and modifications are scheduled for completion prior to restart. If for any reason, the applicant changes its planned actions to address 10 CFR 50.62, it will need to submit a revised TS change for staff approval and address the aging management aspects of the changes as necessary.

Staff Evaluation. After the implementation of the ATWS modifications on Unit 1 there will be no functional differences in the ATWS system between Units 1, 2, and 3. The Unit 1 components

that perform the ATWS function will be incorporated into the appropriate AMPs specified in the LRA and there will be no unit-specific differences.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by May 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

**Conclusion.** During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the ATWS modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff did not identify any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.6.1.8 Reactor Vessel Head Spray**

**Description.** The reactor vessel head spray piping is susceptible to IGSCC and was included in GL 88-01. The applicant responded to GL 88-01 for all three units by letter dated August 1, 1988. In that letter, the applicant notified the staff that it had previously removed the head spray piping from Units 2 and 3, and planned to remove the head spray piping from Unit 1 prior to startup. The staff's approval was provided on December 3, 1993. The applicant reconfirmed, in its July 21, 2004, supplemental response to GL 88-01 for Unit 1, that it planned to remove the reactor vessel head spray piping prior to Unit 1 restart.

On Units 2 and 3, the reactor vessel head spray piping within the drywell has been removed and the reactor vessel head penetration has a flanged cap installed. The primary containment isolation valves have been removed and the primary containment penetration has been sealed. Head spray piping has also been removed and a permanent welded cap has been installed at the RHR system interface with its head spray header.

**Difference Resolution.** The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved prior to Unit 1 restart by performing these head spray modifications on Unit 1. Once the head spray modifications are completed on Unit 1 prior to restart, the physical and operational differences between Unit 1 and Units 2 and 3 will be resolved.

**UFSAR Impact.** The Unit 1 systems impacted by this modification and their LRA sections:

Reactor Vessel Internals (2.3.1.2)

Residual Heat Removal (2.3.2.4)

Following resolution of this item, the license renewal results shown with a bold-bordered box in the LRA sections identified above will be applicable to Unit 1.

Schedule for Completion. The Unit 1 modification is scheduled for completion prior to restart and currently forecasted to be completed by June 2006.

Staff Evaluation. After the implementation of the reactor vessel head spray modifications on Unit 1 there will be no functional differences in the reactor vessel head spray system between Units 1, 2, and 3. The Unit 1 components that perform the reactor vessel head spray function will be incorporated into the appropriate AMPs specified in the LRA, and there will be no unit-specific differences.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by June 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the reactor vessel head spray modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff did not identify any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.6.1.9 Hardened Wetwell Vent**

Description. In GL 89-16, dated September 1, 1989, the staff requested applicants with Mark I containments to voluntarily install a hardened wetwell vent. In response, the applicant committed, by letter dated October 30, 1989, to install a hardened wetwell vent prior to restart of each unit. The hardened wetwell vent has been installed on Units 2 and 3, but has not yet been implemented on Unit 1.

Difference Resolution. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved prior to Unit 1 restart by the installation of the hardened wetwell vent on Unit 1. Once the modifications are completed, the physical and operational differences between Unit 1 and Units 2 and 3 will be resolved.

UFSAR Impact. The Unit 1 system and structure impacted by this modification and their LRA sections:

- containment (2.3.2.1)
- reinforced concrete chimney (2.4.6.1)

Following resolution of this item, the license renewal results shown with a bold-bordered box in the sections identified above are applicable to Unit 1.

Schedule for Completion. The Unit 1 modification is scheduled for completion prior to restart and this modification is currently forecasted to be completed by May 2006. If for any reason, the applicant decided it would implement an alternate solution to GL 89-19, the applicant would be required to notify the staff, and include any alternate modifications within the appropriate AMPs.

Staff Evaluation. After the Unit 1 hardened wetwell vent modifications are completed, there will be no functional differences in the associated systems for Units 1, 2, and 3. The Unit 1 components that comprise the hardened wetwell vent will be incorporated into the appropriate AMPs specified in the LRA, and there will be no unit-specific differences.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by May 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the hardened wetwell vent modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff did not identify any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### ***2.6.1.10 Service Air and Demineralized Water Primary Containment Penetrations***

Description. The staff requested, by letter dated May 5, 1992, information regarding Unit 1 compliance with NUREG-0737, Item II.E.4.2; and 10 CFR Part 50, Appendix J. The staff compared the Unit 1 containment isolation scheme to the Unit 2 design and concluded, in the January 6, 1995, safety evaluation, that the isolation design was acceptable. Currently, the configuration of the Unit 1 primary containment penetrations numbers, X-20 and X-21, are different from the corresponding configuration on Units 2 and 3. On Unit 1 the penetrations are piped to the service air and demineralized water systems with primary containment isolation valves. On Units 2 and 3, they are capped and not assigned to a service system. These penetrations on Unit 1 will be capped and made identical to those of Units 2 and 3.

Difference Resolution. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved prior to Unit 1 restart by making the Unit 1 configuration the same as the current Units 2 and 3 configuration. Once the service air and demineralized water systems modifications are completed on Unit 1, the physical and operational differences between Unit 1 versus Units 2 and 3 will be resolved.

If for any reason, the applicant decided it would not implement the committed modifications, the applicant would be required to notify the staff so that the following action to bring the item into the scope of managed piping would apply. The Unit 1 associated piping and components that are to be removed are shown on the Unit 1 boundary drawings and if the piping were not removed, the AMPs specified in the LRA would apply. Thus, there would be no change in the application if the committed modifications were not completed.

UFSAR Impact. The Unit 1 systems impacted by this modification and their LRA sections:

- service air (2.3.3.11)
- condensate and demineralized water (2.3.4.2)

Following resolution of this item, the license renewal results shown with a bold-bordered box in the LRA sections identified above will be applicable to Unit 1.

Schedule for Completion. The Unit 1 modification is scheduled for completion prior to restart and is currently forecasted to be completed by May 2006.

Staff Evaluation. After the modifications to the Unit 1 service air and condensate and demineralized systems piping are completed there will be no functional differences in the associated primary containment configurations for Units 1, 2, and 3.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by May 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the service air and demineralized water primary containment penetrations modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff did not identify any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.6.1.11 Auxiliary Decay Heat Removal System**

Description. As described in UFSAR 10.22, the ADHR system only serves Units 2 and 3. The only intended function for license renewal is to provide secondary containment integrity for the ADHR system's piping that transfers the fuel pool heat.

The ADHR system provides an NSR means to remove decay heat and residual heat from the spent fuel pool and reactor cavity, and currently serves only Units 2 and 3. The ADHR allows servicing of the RHR system components earlier in an outage, thus, potentially reducing the outage duration. The only intended function for license renewal is to provide secondary containment integrity for the ADHR system's piping that transfers the fuel pool heat to the heat sink outside containment. There is currently only a single piping loop serving both Units 2 and 3 that penetrates the secondary containment.

The configuration of the ADHR system will be modified to service Unit 1 as well as Units 2 and 3. When modified, there will continue to be only a single piping loop that penetrates the secondary containment. That loop and its secondary containment penetrations will serve all three units.

Difference Resolution. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved prior to Unit 1 restart by modifying the ADHR system to service Unit 1 as well as Units 2 and 3. When modified, there will continue to be only a single piping loop that penetrates the secondary containment. That loop and its secondary containment penetrations will serve all three units. Once the ADHR modifications are completed on Unit 1 prior to restart, the physical and operational differences between Unit 1 and Units 2 and 3 will be resolved.

UFSAR Impact. The Unit 1 system impacted by this modification and its LRA sections and table is the auxiliary decay heat removal system (2.3.3.24 and 3.3.2.1.24 and Table 3.3.2.24).

Following resolution of this item, the license renewal results shown with a bold-bordered box in the LRA sections and table identified above will be applicable to Unit 1. Should the applicant not make the modifications discussed above, the applicant would be required to notify the staff. Since these associated additional components planned to be installed would not be installed, the boundary drawings for Unit 1 would not change, and the additional components would not be included within the appropriate AMPs as currently planned.

Schedule for Completion. The Unit 1 modification is scheduled for completion prior to Unit 1 restart and is currently projected to be complete by May 2005.

Staff Evaluation. After the modifications to the ADHR system are completed there will be no functional differences in the system for Units 1, 2, and 3.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by May 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the ADHR system modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the

SER, and the staff did not identify any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.6.1.12 Maintenance Rule**

Description. By letter dated August 9, 1999, the staff issued a partial temporary exemption. This exempts the applicant from the specific scoping requirements of 10 CFR 50.65(b) and allows it to maintain the defueled and long-term layup status of Unit 1. The exemption does not impact Maintenance Rule scoping for equipment required to be functional to support Unit 1 in its defueled status or equipment required to support operation of Units 2 and 3.

The scoping results for the affected SSCs will not be changed. No changes are expected for AMR results or TLAAs.

The temporary exemption expires upon restart of Unit 1.

Difference Resolution. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved upon the restart of Unit 1, when the temporary exemption ceases to be effective. Specifically, with respect to the CLB differences identified in the application, the differences in the Maintenance Rule implementation will be resolved.

UFSAR impact. There are no Unit 1 systems impacted by this modification because Unit 1 SSCs not required to be functional during the current shutdown and defueled status are not included within the scope of the Maintenance Rule.

Schedule for Completion. The committed completion date is at Unit 1 restart because the temporary exemption will expire upon Unit 1 restart and the full scope of the Maintenance Rule will apply to Unit 1.

Staff Evaluation. After the Maintenance Rule modifications are completed upon Unit 1 restart, there will be no functional differences in the system for Units 1, 2, and 3.

As stated above, this modification is forecasted to be completed upon Unit 1 restart, and it will be duly tracked by a separate LRA Appendix A commitment and LRA inspection prior to restart to confirm implementation.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by Unit 1 restart. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the Maintenance Rule modification. The scoping and screening reviews were done based on the

CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff did not identify any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.6.1.13 Reactor Water Cleanup System**

Description. BFN has selected an option in the RWCU System Program that allows the applicant not to test system piping outboard of the outboard primary containment isolation valve provided that the following actions are completed:

- The RWCU piping outside the outboard primary containment isolation valves will be replaced with IGSCC-resistant piping
- The actions requested in GL 89-10 SR Motor-Operated Valve Testing and Surveillance, will be satisfactorily completed for the RWCU system; and, in addition, the RWCU system will be reconfigured so that the pumps are no longer exposed to a high temperature environment, consistent with Units 2 and 3.

The applicant committed to replace the 4-inch and larger, stainless steel, RWCU piping located outside the drywell prior to the restart of Unit 1. The applicant also committed to develop and implement a comprehensive Motor-operated Valve Testing and Surveillance Program for Unit 1, satisfying the intent of GL 89-10. At the time of its restart, the Unit 1 RWCU system will have been reconfigured so that the pumps are no longer exposed to a high-temperature environment.

Difference Resolution. The differences between the CLB for Unit 1 and the CLB for Units 2 and 3 will be resolved prior to Unit 1 restart by performing the actions described above. Once these actions have been implemented, there will be no operational differences between the Unit 1 RWCU system and the Units 2 and 3 systems.

UFSAR Impact. The Unit 1 system and AMP impacted by this modification and their LRA sections:

- reactor water cleanup (2.3.3.21)
- Reactor Water Cleanup System Program (B.2.1.22)

Following resolution of this item, the license renewal results shown with a bold-bordered box in the LRA sections identified above will be applicable to Unit 1.

Schedule for Completion. The Unit 1 modification is scheduled for completion prior to restart and is currently projected to be complete by July 2006.

The applicant will have completed the above commitments prior to Unit 1 restart since the piping has been removed and the system is being reconfigured as described above. Other

license conditions will not allow the applicant to enter the period of extended operation without implementing this modification

Staff Evaluation. Prior to the restart of Unit 1, the applicant will have completed replacement of the RWCU system piping outside the outboard primary containment isolation valves, and completed implementation of its GL 89-10 program, such that the Unit 1 differences identified in the application in this regard are no longer applicable.

In its submittal dated January 31, 2005, the applicant forecasted that this modification will be completed by July 2006. This commitment will be tracked through a temporary instruction TI-2509-01 as a part of the license application verification that this commitment will be completed prior to Unit 1 restart. Other license conditions will not permit the applicant to enter the period of extended operation without implementing this modification.

Conclusion. During its review of the information provided in the LRA, license renewal drawings, and licensing-basis information, the staff did not identify any omissions or discrepancies in the applicant's scoping and screening results for the structures and components because of the reactor water cleanup system modification. The scoping and screening reviews were done based on the CLB. The differences between the units' CLBs that are relevant to the application will be resolved prior to Unit 1 restart. The Unit 1 systems and structures impacted by this modification, and their LRA sections and tables as indicated in the list above, were evaluated elsewhere in the SER, and the staff did not identify any omissions or discrepancies. Therefore, the staff concluded that the applicant had adequately identified the Unit 1 SSCs within the scope of license renewal, as required by 10 CFR 54.4 (a), and the SSCs that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

## **2.6.2 Staff Evaluation**

The staff evaluation of LRA Appendix F items used the methodology described in SER Section 2.6.1 to determine whether these items had been adequately scoped and screened. The staff did not perform any safety review of any of these modifications, but performed a limited disposition of the resolution activities for each of the LRA Appendix F items that will be completed prior to Unit 1 restart. As stipulated and agreed upon with the staff in its pre-application meetings, the applicant provided in its submittal dated January 31, 2005, "Additional Information Concerning the Integration of Unit 1 Restart and License Renewal Activities," a status update on completion of the restart activities that impact the CLB of Unit 1. The SER with OI presents the latest information on these modifications. Accordingly, the staff found that the disposition and validation of the modifications were consistent with the commitments. The staff will track modifications and implementation details of these items via separate LRA inspections prior to Unit 1 restart to confirm implementation.

In reviewing the technical information provided in LRA Appendix F, the staff review was limited to verifying:

- (i) The sufficiency of information provided by the applicant for the 13 items that impacted the LRA review.
- (ii) The applicability of the 13 items to Unit 1.

- (iii) The systems these 13 items impact.
- (iv) The plan to resolve differences between the CLB for Unit 1 and the CLB for Units 2 and 3, so that upon restart all units will have the same CLB.

It should be noted that in the LRA the restart activities listed in LRA Appendix F were generally referred to as differences in the design basis or licensing basis. Based on the definition of CLB in 10 CFR 54.3, these activities are more precisely described as implementation activities of the design and licensing basis. Even though each of the 13 activities listed in LRA Appendix F is committed to and planned for completion prior to Unit 1 restart, any unimplemented commitments would remain valid, part of the CLB, carry over into the renewed license period, and be controlled by the NRC regulatory and oversight process.

The staff's evaluation of the information provided in the LRA was performed in the same manner for all mechanical, civil, and electrical systems as it relates to the particular item in question. The objective of the review was to determine if the components and supporting structures for a specific mechanical system that appeared to meet the scoping criteria specified in the Rule were identified by the applicant as being within the scope of license renewal. Similarly, the staff evaluated the applicant's screening results to verify that all long-lived, passive components were subject to an AMR in accordance with 10 CFR 54.21(a)(1).

### **2.6.3 Conclusion**

The restart plan ensures compliance with the applicant's commitments made during the shutdown and with regulatory requirements that changed during the extended shutdown. In addition, a license condition will be imposed as part of LRA review that will require the Unit 1 restart activities, described in LRA Appendix F, to be completed prior to Unit 1 restart. Therefore, while implementation of the 13 items identified in LRA Appendix F is not yet complete, the staff found that this will not be a barrier to staff approval of license renewal for Unit 1. This type of approval has not been made for commitments in prior LRAs approved by the staff. Therefore, there are no staff evaluations or staff findings performed for these 13 LRA Appendix F items, except for restating the technical information provided in the LRA and the January 31, 2005, letter, in the format described below and a status update on the physical implementation of these Unit 1 restart activities.

During its review of the information provided in LRA Appendix F, the staff did not identify any omissions or discrepancies in the applicant's integration of Unit 1 restart activities with license renewal activities. Therefore, the staff concluded that, pending satisfactory implementation of the activities identified in LRA Appendix F prior to Unit 1 restart, the applicant had adequately identified the Unit 1 systems, structures, and components that will be within the scope of license renewal, as required by 10 CFR 54.4(a), and the Unit 1 structures and components that will be subject to an AMR, as required by 10 CFR 54.21(a)(1). Satisfactory completion of these actions prior to Unit 1 restart will be a condition of the renewed license.

## **2.7 Conclusion for Scoping and Screening**

The staff reviewed the information in LRA Section 2, "Scoping and Screening Methodology for Identifying Structures and Components Subject to Aging Management Review and Implementation and Results." The staff determined that the applicant's scoping and screening methodology, including its supplement 10 CFR 54.4(a)(2) review which brought additional NSR piping segments and associated components into the scope of license renewal, was consistent with the requirements of 10 CFR 54.21(a)(1) and the staff's position on the treatment of SR and NSR SSCs within the scope of license renewal and the structures and components requiring an AMR is consistent with the requirements of 10 CFR 54.4 and 10 CFR 54.21(a)(1).

On the basis of its review, the staff concluded that the applicant had adequately identified those systems and components that are within the scope of license renewal, as required by 10 CFR 54.4(a), and those systems and components that are subject to an AMR, as required by 10 CFR 54.21(a)(1).

With regard to these matters, the staff concluded that there is reasonable assurance that the activities authorized by the renewed license can continue to be conducted in accordance with the CLB, and any changes made to the BFN CLB, in order to comply with 10 CFR 54.29(a), are in accord with the Act and the Commission's regulations.

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